National Park Service
U.S. Department of the Interior

Wright Brothers National Memorial
Kill Devil Hills, North Carolina

Wright Brothers National Memorial Visitor Center

Historic Structure Report

Cultural Resources
Southeast Region

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WRIGHT BROTHERS NATIONAL MEMORIAL VISITOR CENTER

HISTORIC STRUCTURE REPORT

Cultural Resources, Southeast Region
National Park Service

2002

The historic structure report presented here exists in two formats. A traditional, printed version is available for study at the park, the Southeastern Regional Office of the National Park Service (NPS SERO), and at a variety of other repositories. For more widespread access, the historic structure report also exists in a web- based format through the SERO intranet, which includes links to individual files for a variety of photographs, documents, plans and other material used in compilation of the printed report.

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Southeast Region
National Park Service
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2002
Historic Structure Report
Wright Brothers
National Memorial Visitor Center
Kill Devil Hills, North Carolina
LCS#: 91645

Previous page, south view of
Wright Brothers Visitor Center,
Kill Devil Hills, North Carolina
(WRBR Visitor Center Collection)

Recommended by: _____ 1/14/02
Chief, Cultural Resources Stewardship, Southeast Regional Office — Date

Concurred by: _____ 3/25/02
Superintendent, Wright Brothers National Memorial — Date

Concurred by: _____ 10-24-02
Regional Director, Southeast Region — Date

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Executive Summary

The Wright Brothers National Memorial Visitor Center is of national significance under National Historic Landmark (NHL) Criteria 1 and 4. The property falls under NHL Theme III (Expressing Cultural Values), Subtheme 5 (Architecture, Landscape Architecture, and Urban Design). The property is less than 50 years old but qualifies under Criteria Exception 8 because of its national significance. Because of the copious documentation contained in Sarah Allaback's book *Mission 66 Visitor Centers* (NPS, 2000) and in the NHL registration form, limited contextual research was conducted as part of this Historic Structure Report (HSR). Those narratives have been freely incorporated into the present report.

Archival material relating to the construction and later treatment of the historic building was examined. Most of the relevant documentation can be found at Outer Banks Group headquarters at Ft. Raleigh, but there is also significant documentation, including historic photographs, at the Wright Brothers Visitor Center.

Working in cooperation with Hartrampf Engineers, Jack H. Pyburn, A.I.A., thoroughly investigated the building during the course of a feature inventory and a condition assessment, which were conducted in 1999- 2000. In November 2000, John Scott, architectural conservator with the Northeast Cultural Resource Center, conducted a study of the historic painted and varnished finishes, which included retrieval of samples and matching of original colors.

Most of the building's principal character-defining features remain intact and should be considered significant, including its massing and scale, most of its architectural details, and its several distinctive materials. The primary materials from which the building was constructed were wood, concrete, steel, and glass. The structure of poured- in- place concrete is a primary finish material both on the inside and out. The exposed, bush- hammered, concrete surfaces provided a rich contrast to the channel- groove, wood paneling that was used on the interior and the exterior of the building. Finally, exposed steel, which was originally painted orange, is a significant feature of the interior and exterior of the building.

The building massing and profile were designed to express both the profile of the dunes (dome of the Flight Room) and the sand flats (the low flat roof of the building) and to reference flight (the arched overhang of the Flight Room dome). In the open expanse of the site, this volumetric presentation is both pleasing and compatible with the profile of the adjacent landscape without being dominant or distracting. The arched overhang of the Flight Room roof and the deeply set- back glass wall acknowledge the dramatic summer sun angles and harsh temperatures.

On the interior, nearly all the spaces in the building are original and in their original configuration. The building was designed to produce a sequential experience for the visitor, beginning with the visitor's entrance onto the building platform and continuing through the Lobby, the Museum, and Flight Room to the visitor's exit onto the Ceremonial Terrace. Each space along this carefuly designed visitor "route" is a character- defining space that should be preserved. Certainly, the Flight Room- - with its full- scale models of the Wrights' glider and plane, its domed and ribbed ceiling, and its views- - is the most character- creating space in the building. The Museum, which includes custom- designed cases and mounted displays, is the least-altered of the primary spaces. The lobby, with its views to the flight path and its integral relationship to the other areas, is the third character- defining space in spite of the several changes that have altered its historic appearance.

The National Park Service has been at the forefront of an effort to preserve structures from "the recent past." The Wright Brothers National Memorial Visitor Center offers an outstanding opportunity to showcase an example of mid- twentieth- century modernist design.

As a prototypical visitor center, the building was consciously designed to become an integral part of the site's interpretation. In the fifty years following the first flights, the site had changed dramatically, including a major shift

in the location of the dune from which the early glider tests were made. Under these conditions, the siting and sequence of programmatic events became critical design considerations for introducing the visitor to the site. Mitchell and Giurgola's response included an arrangement of discrete visual barriers to shield views of the parking area and highway, in essence transforming the test field into a "large room" that is entered through the visitor center. This interpretive philosophy, which established the visitor center as an "ante- chamber" or prepatory space for viewing an historic site, has become integral to the conception of the National Park experience.

One of the primary preservation issues with any historic structure is the use to which the structure is put. In almost all cases, continuation of the use for which a structure was designed and built is the preferred alternative, since changes in use generally necessitate significant changes to a building and a resulting loss of character- defining features.

However, a variety of problems with the visitor center were noted in the park's 1997 General Management Plan, most of which are the result of facility overcrowding "during many days [of] the peak use season." In short, the GMP stated, the existing visitor center "does not work" under existing circumstances.

Clearly, if the park is to attain its management objectives, new or expanded facilities are necessary to deal with the increasing number of visitors to the site. Attention has returned, therefore, to a major addition to the existing building. Most significantly, such an addition would allow for creation of a greatly expanded museum celebrating the origins of flight, a long- sought goal of the First Flight Society, its predecessors, and the NPS.

The ultimate treatment of the visitor center will be a rehabilitation project including five primary components:

- preservation and repair of the building's *existing* architecturally significant features and material (exterior envelope, Lobby, Museum, and Flight Room);
- rehabilitation of the building's mechanical and electrical systems to comply with modern building, life safety, and accessibility codes, and to meet current and future programmatic demands;
- design and construction of a new addition that will add a greatly- expanded museum component to the site and accommodate new offices and other service areas;
- adaptive use of the office block of the building to accommodate new functions, e.g., a museum store; and
- restoration of the building's signifigant features that have been lost to unsympathetic modern alterations.

By their very nature, new additions to historic buildings have the potential to damage and destroy significant historic materials and features and to change the building's historic character. A new addition also has the potential to change how one perceives what is genuinely historic and thus to diminish its authenticity and those qualities that make the building eligible for listing in the National Register of Historic Places. Once these basic preservation issues have been addressed, all other aspects of designing and constructing a

new addition to extend the useful life of the historic building rest with the creative skills of the architect. A project involving a new addition to a historic building is considered acceptable within the framework of the National Park Service's standards if it:

- preserves significant historic materials and features, and
- preserves the historic character, and
- protects the historical significance by making a visual distinction between old and new.

Administrative Data

Locational Data

Building Name: Wright Brothers Visitor Center
Building Address: Wright Brothers National Memorial
NC Hwy. 158
Kill Devil Hills, NC 27948
LCS No. 91645

Proposed Treatment

While the GMP (1997) for the Wright Brothers site assumed demolition of the visitor center, listing of the structure as a National Historic Landmark in 2001 has forced reconsideration of the building's treatment. In essence, the ultimate treatment of the visitor center that is recommended in this HSR can be described as a rehabilitation project that includes four primary components:

1. preservation and repair of the building's *existing* historically significant features and material, especially on the exterior and in the Lobby, Museum, and Flight Room, which are the building's principal character- defining spaces;
2. rehabilitation of the building's mechanical and electrical systems to comply with modern building, life safety, and acces-

sibility codes, and to meet current and future programmatic demands;
3. design and construction of a new addition that will add a greatly expanded museum component to the site and accommodate new offices and other service areas; and
4. restoration of the building's most- significant features that have been lost to unsympathetic modern alterations.

Related Studies

Allaback, Sarah. *Mission 66 Visitor Center: The History of a Building Type.* Washington, D. C.: U. S. Department of the Interior, NPS, 2000.

Amundson, Theodore Arden. *Wright Brothers National Memorial: Administrative History, 1968- 1987.* Department of the Interior, National Park Service, 1987.

Chapman, William R., and Jill K. Hanson. *Wright Brothers National Memorial: Historic Resource Study.* Atlanta: NPS Southeast Field Area, 1997.

Hewes.Andrew, M. *Wright Brothers National Memorial: An Administrative History.* Washington. DC: Department of the Interior, National ParkService, 1967.

National Park Service. *Wright Brothers National Memorial: General Management Plan & Environmental Assessment.* Atlanta: Southeast Support Office, 1997.

Cultural Resource Data

National Historic Landmark, designated on January 3, 2001.

National Register of Historic Places, designated a contributing building on February 27, 1998 (North Carolina state level of significance meeting Criteria C for its architecture).

Periods of Significance

The original building (1959- 1960) is nationally significant as an outstanding example of Modernist architecture and for associations with the NPS' "Mission 66" initiative.

Historical Background & Context

Editor's note:

The text in this section has been taken and condensed from the National Historic Landmark registration form (NPS, 2000) and from Sarah Allaback's *Mission 66 Visitor Centers: The History of a Building Type* (NPS, 2000). Allaback's work provides extensive documentation for the historical context for the Wright Brothers facility and other contemporaneous visitor centers. Footnotes have been generally omitted here, but Allaback's chapter relating to Wright Brothers is included with footnotes in Appendix A.

Designated a National Historic Landmark on January 3, 2001, by Secretary of the Interior Bruce Babbitt, the Wright Brothers National Memorial Visitor Center is of national significance for its associations with broad national patterns of American history, specifically the Park Service's "Mission 66" program, which transformed the American national park system to meet postwar conditions. First introduced in 1956, the "visitor center" was the central planning and design element of the Mission 66 program, and it was the most significant architectural expression of national park development in the postwar period. Subsequently the visitor center concept became the centerpiece of park planning of all types, both nationally and abroad, and the Wright Brothers National Memorial Visitor Center was one of the most significant and successful examples of the new building type.

A high- profile project for Mission 66, in part because of the fiftieth anniversary of the first flight in 1953, the Wright Brothers Visitor Center was an early, precedent- setting example of the use of modern architecture that was embraced by the Park Service as

part of Mission 66. The critical and popular success of the building's design legitimized the use of modern architecture in national parks. Advanced building technology, efficient materials, and labor- saving construction were also showcased by this benchmark project. The Wright Brothers National Memorial Visitor Center was a powerful and influential early example of how modern design and construction techniques could be appropriate for national park development.

The outstanding critical acclaim that greeted the building may have taken many by surprise. At the time, Ehrman Mitchell and Romaldo Giurgola had been in business only two years and had never had a commission that attracted national attention. The Wright Brothers National Memorial Visitor Center did attract national attention in contemporary design magazines, among other architects, and within the Park Service; and it became a national showcase for the Mission 66 program. The Wright Brothers commission also launched the firm of Mitchell/Giurgola into national prominence and it went on to become one of the most important American architectural firms of the 1960s and 1970s. Since then, numerous publications and surveys on American architecture have remarked on the significance of the Wright Brothers Visitor Center.

Mitchell/Giurgola also brought early recognition to the Philadelphia School of modern architecture. In the late 1950s and early 1960s, a small group of architects in Philadelphia, inspired in part by the teaching and work of Louis I. Kahn, began to move away from the strict formalism and objectivism of the International Style, as it was advocated by Walter Gropius and Mies Van der Rohe. As Romaldo Giurgola put it in a recent interview, "The design [of the visitor center] reflected the particular period of American architecture of the early 60s in which the rigidity of modernism evolved into more articulated solutions integrating internal and external spaces." The Wright Brothers National Memorial Visitor Center is one of the most important examples nationally of the emerging style of this school. The Wright Brothers building was the first major success for Mitchell/Giurgola; it significantly influenced their own later work and, as a result, the course of American architecture.

Context

Built on the site of the first successful powered flight of a heavier- than- air machine- - the treeless, wind- swept dunes of Kill Devil Hills on North Carolina's Outer Banks- - the Wright Brothers National Memorial had its origins in 1927 when Congress first authorized establishment of the Kill Devil Hill Monument National Memorial. By then, there had already been major changes to the site, including the loss of the historic Wright- era structures and natural migration of Kill Devil Hill (which was little more than a large sand dune) some 600 feet to the southwest of its original location.

By the time the great memorial "pylon" was constructed atop Kill Devil Hill in 1931- 32, the hill and much of the surrounding landscape had been stabilized with native grasses and other vegetation. Administration of the site was shifted from the War Department to the NPS in 1933, and over the next three years, an extensive system of roads and walkways which formed the basis for today's circulation pat-

terns on the site, was installed. Plans for a great park laid out in the Beaux Arts tradition were developed by the Park Service during this period as well but were never implemented.

In the 1920s, the original sponsors of the Memorial had also envisioned a major museum, but that goal remained illusive as the Great Depression and World War II drained the country's resources. After the War, the Kill Devil Hills Association, which led the commemorative efforts at the site, proposed an "appropriate ultra- modern aviation musuem" when they attempted unsuccessfully to acquire the Wright brothers' original 1903 plane. By the early 1950s, prospects for funding such an ambitious undertaking began to seem credible and, when the Association was reorganized as the Kill Devil Hills Memorial Society in 1951, a "Wright Memorial Committee" was established to lead a major development campaign for the site. In preparation for the committee's first meeting in February 1952, the Park Service drafted preliminary plans for a museum facility that would consist of a "group of buildings of modern form" that would include a "court of honor," "Wright Brothers exhibit area," "library and reception center," and a "first- flight memorial hall" with outdoor terraces facing the flight markers and Kill Devil Hill. Originally scheduled for completion by the first- flight's fiftieth anniversary in December 1953, the museum project was not realized, lacking the estimated one million dollars needed for construction. Nevertheless, by the anniversary, some improvements had been made to the site, including reconstruction of the Wrights' living quarters, hangar, and wooden tracks.

Efforts to raise funds for an aviation museum were continued by the Memorial Society, but even anticipated support from the aircraft industry evaporated in the fall of 1957, and the plans seemed doomed to failure. In October 1957, however, the Park Service unveiled plans for a scaled- back version of the project as part of its Mission 66 program to rebuild facilities at the nation's parks and historic sites.

Mission 66 and Modernism

The national parks had been badly neglected after the New Deal improvements of the 1930s and by the 1950s were fast becoming a national disgrace. Funding for basic maintenance was thoroughly inadequate, and the parks' aging facilities were being overrun by the nearly tenfold increase in visitation that had occurred over the preceding twenty years. To deal with the crisis, Conrad Wirth, who had been appointed director of the NPS in 1951, decided to forego the traditional annual budget requests in favor of a billion- dollar, ten- year campaign that would modernize the entire park system by the time of the fiftieth anniversary of the NPS in 1966.

Planned in 1955, the Mission 66 program was announced in February 1956 and met with immediate approval by the Eisenhower administration. By the end of the program, the National Park Service had built 584 comfort stations, 221 administrative buildings, 36 service buildings, 1,239 employee housing units, and more than 100 new visitor centers.

Mission 66 reached the drawing boards in the mid- 1950s when modern styles of architecture had reached the mainstream of American ar-

chitectural design. NPS designers readily exploited the functional advantages offered by postwar architectural theory and construction techniques and, in the process, created a distinctive new architectural style that has been called "Park Service Modern." Mission 66 architects (whether in- house or consultants) employed free plans, flat roofs, and other established elements of modern design in order to create spaces in which large numbers of visitors could circulate easily and locate essential services efficiently.

The acceptance of modernism and its use in the parks was also a matter of urgency and economics. The Park Service needed to serve huge numbers of people as quickly as possible, and, despite increased funding, it had to do so on a limited budget. The often less- expensive materials that composed modern buildings (e.g., steel, concrete, and glass) allowed more facilities to be built for more parks. Concrete was praised by the Park Service as a "low- cost, long- lived beauty treatment for parks," and even asphalt was described as "nature's own product for nature's preserves."

The very concept of the "visitor center," too, emerged during this period, and the Mission 66 visitor centers remain today as the most complete and significant expression of the Park Service Modern style. By grouping a variety of old and new services in one large building, park planners hoped to establish a control point for "visitor flow," creating a pattern of public use that would ensure that all visitors would receive basic orientation and services in the most efficient way possible. Centralization of interpretive and museum displays, administrative offices, restrooms and other facilities into a single building ran counter to the pre- war concept of scattered development and was directly related to the efforts by NPS planners to control the unprecedented numbers of visitors and their automobiles that were overwhelming the nation's parks.

Throughout the Mission 66 program, the Park Service's overriding goal for all of its visitor centers was to improve interpretation and to stimulate public interest in the park. As a result, visitor centers were sometimes sited "right on top of the resource" so that visitors could "see virtually everything from the visitor center." In the view of Park Service historians and planners, some encroachment on the historical and natural environment could be justified because of the more effective public education that they believed could result from siting the visitor center close to the resource itself.

As a result, the park visitor center became "the hub of the park interpretive program" and the means by which visitors could be properly oriented. No longer would the visitor, who had lacked these comprehensive services prior to Mission 66, "drive almost aimlessly about the parks without adequate benefit and enjoyment from their trips."

Mitchell/Giurgola, Architects

The recesssion that gripped the nation's economy in 1957 provided a jump start for a number of Mission 66 projects when the Park Service was directed "to get every project on the street." With eight projects and only seven architects, the Park Service hired the untested partnership of Ehrman B. Mitchell and Roma-

ldo Giurgola to design the new visitor center at Wright Brothers National Memorial. It was a good decision although the publicity that the building would receive in major architectural journals over the next decade resulted not from the architects' reputations but from the quality of the design of their building.

The outstanding critical acclaim that greeted the building may have taken many by surprise, especially since Ehrman Mitchell and Romaldo Giurgola had formed their partnership only in 1957 and had never had a commission that attracted national attention. The Wright Brothers National Memorial Visitor Center did attract national attention, in contemporary design magazines, among other architects, and within the Park Service. The building became a national showcase for the Mission 66 program and an important factor in legitimizing the use of modern architecture in the national parks. It also launched the firm of Mitchell/Giurgola into national prominence, and it went on to become one of the most important American architectural firms of the 1960s and 1970s. Since then, numerous publications and surveys on American architecture have remarked on the significance of the Wright Brothers Visitor Center.

Later, the partners would receive the American Institute of Architects (A.I.A.) Firm Award, the organization's most distinguished award for an office. The bicentennial year also marked the dedication of Mitchell/Giurgola's second Park Service structure, the Liberty Bell Pavilion on the mall across from Independence Hall. Among the firm's many significant achievements are the Headquarters Building of the United Fund in Philadelphia (1971), of which one architectural historian declared, "One has but to travel up and down the east coast of the United States to see the influence it has had on urban architecture." Mitchell served as president of the A.I.A. in 1979- 80, and in 1982, Giurgola was awarded the A.I.A. Gold Medal, the highest honor bestowed upon individual architects. The Wright Brothers Visitor Center was featured not only in the A.I.A. nomination but also as part of a traveling "Gold Medal Exhibition" sent to schools across the nation. Architectural historians assessing the firm's career look to this building as its first significant work, a benchmark from which to judge their future growth.

Chronology of Development & Use

Figure 1 Wright Brothers Visitor Center, presentation drawing, 1959 (National Park Service Technical Information Center, Denver Service Center)

Editor's note:

As with the "Historical Background and Context," this section is extracted from the NHL registration and from Dr. Allaback's work. The extensive endnotes in those narratives have have been generally omitted here, but Allaback's chapter relating to Wright Brothers is included with footnotes in Appendix A. Additional information and details not included in those narratives have been added to the narrative of the building's construction and subsequent modifications and footnoted as appropriate within the present text.

During his speech at the 1957 First Flight Anniversary ceremony, NPS Director Conrad Wirth described "major developments" scheduled for the Wright Brothers site over the next two years. The Park Service planned to proceed immediately with construction of a new entrance road and parking lot for the visitor center, with actual construction of the visitor center to begin during the next fiscal year. The new building would, according to Wirth, "accommodate visitors in large numbers ... provide for their physical comforts ... and present the story of the Wright Brothers at Kill Devil Hill in the most effective way graphic arts and modern museum practice can do it."

The new building transformed the visitor experience at Wright Brothers and precipitated closure of the memorial shaft, which had been open for visitors to climb since its completion in 1932. During an August 1958 committee meeting, members agreed that "special consideration be given to directing people to the first

Figure 2 Mitchell/Giurgola's model of Flight Room dome; published in *Progressive Architecture*, February 1959 (National Park Service Technical Information Center, Denver Service Center)

flight area rather than to the memorial feature." According to Superintendent Dough's monthly report, "Mr. Benson of EODC and Messrs. Mitchell, Cunningham and Giurgola" visited the site on March 15 "in order to work up final drawing plans for the visitor center." These were actually preliminary design studies, the first of over one hundred sketches and drawings created for the visitor center. The next month, "Messrs. Tom Moran, Harvey H. Cornell (landscape architect), Donald F. Benson and others" gathered to discuss location of the visitor center and parking area.

A collaborative design effort developed between the architects and the Park Service as its planners began development drawings of the entrance road from Route 158 (which was still under construction) and of the parking lot, visitor center footprint, and paths to the quarters and hangar. The location of these features and the connections between them were approved by the Eastern Office of Design and Construction (EODC) supervising architect John Cabot, NPS Regional Director Elbert Cox, EODC chief Thomas Vint, and NPS director Conrad Wirth between April and June 1958. As the Mission 66 report for the park emphasized, the visitor center was to be "within the Memorial near the camp buildings" and a trail would lead from the facility to the first flight area. Mitchell corroborated that the siting of the building was entirely a Park Service decision. The site was "exactly what they dictated. The location was specified as being close to the flight line." In a recent letter, Giurgola agreed that the site "was carefully planned while working closely with the NPS." The Park Service wanted the public to stand under the dome and be able to see the monument and first flight markers from inside the building.

Designing the Visitor Center

Mitchell/Giurgola's early sketches on yellow trace were produced in March and April 1958 and included several very different ideas for

the overall plan of the building and its exhibition space. In one case, the architects envisioned a two- story gallery and an office wing separated from the rest of the building by a landscaped courtyard. They also considered placing the central lobby and information area between an office wing and exhibit gallery and even considered creating a mezzanine around the assembly room that would allow visitors to view the site through the dome's clerestory windows.

A version of the compact organization that would become their final choice was considered in March but not accepted until later in the design process. The architects' proposals for the double- height gallery and fenestration demonstrated their interest in creating dramatic effects of light and shadow, and maximizing the opportunity to frame specific exterior views. In some of the sketches the architects used brilliant colors- - bright white, yellow, and turquoise- - to emphasize the contrast between translucent and solid sections of the window walls.

Mitchell/Giurgola's designs challenged "the rigidity of modernism" through what Giurgola later described as "more articulated solutions integrating internal and external spaces."[1] As a result, they were considering the location of the building in relation to the hilltop monument and the flight area throughout the design process. Preliminary site sketches include arrows indicating vistas from the building to

1. Romaldo Giurgola to Carol Shull, March 4, 1997, copy in WRBR files.

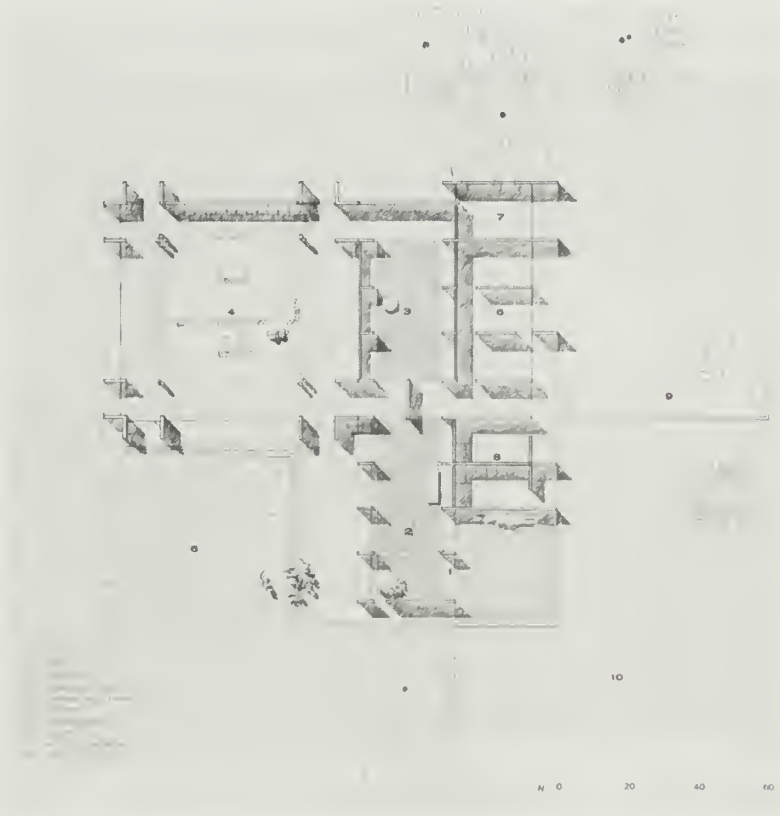

Figure 3 Wright Brothers Visitor Center, presentation drawing, 1959. Image was used on the cover sheet for the final drawings for the Visitor Center and also appeared in *Progressive Architecture*, April 1961 (National Park Service Technical Information Center, Denver Service Center)

these points of interest. The firm's early design efforts demonstrate a wide range of possibilities, but none compare with the final plan in terms of clarity of program, circulation, and function.

The preliminary plans submitted by Mitchell/ Giurgola at the end of the summer were visually pleasing as well as instantly readable. The initial sketch in the series depicts only the building's Ceremonial Terrace, the roof overhang, and the edge of the Lobby framing a panoramic view of the monument, barracks, and take- off and flight markers. The final plan organized the elements of the program within a square, avoiding the potential monotony of such geometry by alternating interior spaces with open exterior terraces. From some angles, the thin- shell dome appears to dominate the structure, but, as the building is approached, it gradually levels out and almost disappears. Among the preliminary sketches is a view of the building and the distant Wright Brothers monument against the night sky. Two- thirds of the paper is black, the building barely distinguishable among the trees and gentle rise of the horizon. Attention is focused on the road leading into the park, an exiting car, and a car passing by on the main highway.

The working drawings essentially refined the designs presented earlier, but the cover sheet depicts an unusual presentation of the floor plan. Here, an axonometric view emphasizes the extent of window space- - shown as thin solid lines- - in contrast to the three- dimensional walls. A plan and elevation of the Wright Brothers visitor center appeared in a "news report" in the professional journal *Progressive Architecture* in February 1959. Entitled "Two Visitors' Centers Exemplify New Park Architecture," the short article noted that "the design of visitors' facilities provided for national tourist attractions seems to be decidedly on the upgrade, at least as far as the work for the National Park Service is concerned." Later that year, the architects submitted a presentation drawing, complete with a small boy flying a toy plane in front of the ceremonial terrace, and a twelve- inch sectional model of half of the Flight Room, in which the concrete dome appeared lighter and more "wing- like" than depicted by drawings.

In a one- sheet "resume" promoting Mitchell/ Giurgola Associates and written a few years after the visitor center dedication, the architects described the Wright Brothers commission as "among our major projects" and went on to discuss its design in some detail. The "dome- like structure over the assembly area," though technically "a transitional thin shell concrete roof with opposed thin shell overhangs connecting the perimeter of the structure to form a complete monolithic unit," also has a symbolic role. The roof structure design "admirably serves to allow light into the display area for the aircraft to give this area a significant character as well as forming a strong focal point on the exterior of the structure which stands above the low- lying landscape, in concert with the higher rising dunes and pylon."

Evidently, the north concrete wall of the entrance terrace had been the subject of considerable public speculation. In their resume, the architects explained that the patterned wall was intended "to be an expression of the plastic quality of concrete by means of well-

Figure 4 Wright Brothers Visitor Center lobby, ca.1959. (WRBR Visitor Center Collection)

defined profiles, recessions and protrusions, simply placed to form an integral pattern over the wall surface." The wall not only featured rigid and curved shapes, but also contrast in depth and surface, as sections of the wall were bush hammered. In effect, the concrete patterned wall was public art.

The attention given to aesthetics and symbolic purpose as described by Mitchell/Giurgola did not detract from the visitor center's practical function. Visitors appreciated the straightforward approach to the building from the parking lot and the exterior restrooms adjacent to the entrance terrace. They may not have noticed the unusual shape of the drinking fountains, with their molded concrete basins, or paid much attention to the undulations and protrusions of the sculpted wall. Even at the most basic level, however, these design elements suggested the free- flowing form of both sand dunes and objects that fly.

With the Park Service information desk actually located behind the visitors as they entered the building, attention was immediately directed towards the ceremonial terrace outside and the first flight monuments beyond. And since the lobby space flowed into the Museum, visitors gravitated to this area after taking in the view. The walls of the exhibit area were entirely covered with vertical channel- groove[1] cypress paneling. This interior treatment, combined with the lack of windows, resulted in an inward- looking museum space conducive to study. Park offices were located to the right of the exhibit area. Once visitors had followed the exhibits in a rectangular pattern around the museum, they found themselves at the entrance to the Flight Room. In contrast to the muted tones and contemplative mood of the museum, the Flight Room was a double- height space full of light from the four

1. The cypress paneling is not tongue-and-groove, as previously recorded in building documents.

clerestory windows in its shell roof and the floor- to- ceiling windows on three sides. The shell roof, the 40- foot- square shape of the space, and the square mirrored above in the corrugated concrete overhang also emphasized the importance of the replica of the Wrights' glider and plane in the center of the room. This assembly area was intended to substitute for an audio- visual or auditorium space, and in their presentations, Park Service interpreters would not only use the plane as a prop but point out the flight markers, hangar and living quarters, and distant hilltop monument. Double doors at either end of the south facade led out to the ceremonial terrace. When groups gathered here for the annual celebration and other events, the Memorial's significant features stood in the background.

The light admitted into the building because of its design and southern orientation and the interior contrasts of ceiling heights are two of the outstanding features of Mitchell/Giurgola's visitor center. Equally significant is the variety of materials found in the structure, with walls alternating between expanses of steel-framed glass, cypress wood panels, and treated- concrete piers with bush- hammered faces. These surface contrasts force the visitor to pay attention to the composition of materials: the durable cypress wood, traditionally used in boat building, and the color and texture of the aggregate, which includes sparkling chunks of quartz and other arresting stones. In theory and practice, the Wright Brothers Visitor Center was a balance between aesthetics and function.

An excellent example of Mitchell/Giurgola's concern with aesthetically pleasing structure is also the least noticeable. The mechanical systems for heating and cooling the building were "inconspicuously incorporated" into the building. *Progressive Architecture* was particularly interested in the "water- to- water heat pump" that both took advantage of the ocean-front location and eliminated the need to compromise the building's "vast horizontality with a vertical stack." Fan- coil units and ducts were hidden above a suspended ceiling in the lobby and museum, but in the assembly room, supply ducts became part of the interior design, although mostly- concealed by the corrugated concrete overhang of the room. In addition, the "soffit" below had a "continuous slot" for return air. Frederick W. Schwarz of Morton, Pennsylvania, was the consulting engineer for the heating and air conditioning system.

Contractor and Subcontractors

Although the Park Service was familiar with the Mitchell/Giurgola design, local contractors must have been surprised when sets of plans and specifications were sent out for bidding in January 1959. Modern architecture was not part of the design vocabulary of the region, nor were modernist buildings prevalent in the state of North Carolina; nevertheless, seven firms submitted bids for the project. Bids were opened on February 4, 1959, and the contract was awarded to the low bidder, Hunt Contracting Company of Norfolk, Virginia, for their offer of $257,203.

When construction of the visitor center began in March 1959, the contractors proposed to complete the building by November; but, according to the project's completion report,

Figure 5 List of subcontractors for construction of Wright Brothers Visitor Center, March 18, 1959-June 20, 1960,compiled from project completion report

Trade	Subcontractor	Location
acoustical ceilings	Manson& Utley, Inc.	Norfolk, VA
HVAC controls	Minneapolis-Honeywell Regulator Co.	Norfolk, VA
electrical	Alston, Inc.	Norfolk, VA
floor tile	The Ajax Company, Inc.	Norfolk, VA
glazing	Perry Paint & Glass Co.	Elizabeth City, NC
HVAC	E.K. Wilson & Sons	Norfolk, VA
pipe insulation	Norport Supply Co., Inc.	Norfolk, VA
lathing	George Turner	Kingston, NC
masonry	E.L. Watson	Edenton, NC
millwork	Burton Lumber Corp.	Norfolk, VA
painting	E. Calgari & Sons	Norfolk, VA
piles	Washington Iron & Metal Co.	Washington, NC
plastering	A.N. Bateman	Columbia, NC
plumbing	E.K. Wilson & Sons	Norfolk, VA
roofing	Weldon Roofing & Sheet Metal, Inc.	Weldon, NC
sheet metal	Hall-Hodges Company, Inc.	Norfolk, VA
steel fabrication	Hall-Hodges Company, Inc.	Norfolk, VA

"the work got off to a very slow start." Weather was generally "favorable" but "by using very few mechanics, and by paying these less than the better mechanics would work for, the contractor delayed his work and had to remove some work which was not satisfactory." In addition, the report noted that the subcontractors "were often delayed by the general contractor's poor organization." The contractor also did work at Cape Hatteras National Seashore, and it, too, had a similar experience. In the end, the completion report noted, "both parks feel that he should be prevented from bidding on future work because of the difficulties experienced in working with him." In spite of what turned out to be ongoing problems with the contractor, the subcontractors were "generally quite satisfactory," according to the completion report. Sixteen subcontractors were listed in the report, most of them from Norfolk.

Building the Visitor Center

While the architects worked out the building's design in the spring and summer of 1958, the NPS had turned its attention to construction of the parking facilities accompanying the new building. In June 1958, the contract for the new entrance road and parking area was

awarded to Dickerson, Inc., of Monroe, North Carolina, for the low bid of $73,930. The road and parking area were to be completed within 250 days. A group of EODC architects and landscape architects- - Zimmer, Moran, Roberts, and McGinnis- - visited in August "to discuss plans for the Visitor Center and Parking Area." As Superintendent Dough remarked, "the completion of the road project will pave the way for the building contractor." The planning for the visitor center project also provided the incentive to finalize a land acquisition deal for which state funds had already been allotted. Congress authorized the Memorial's boundary expansion in June 1959, adding an additional 111 acres to the park. This extension provided the additional land to the east and north of the building necessary to include the fourth landing marker and parking lot.

In spite of the contractor's slow start, foundation piles were being driven and made ready for the grade beams by the end of March 1959. Superintendent Dough predicted rapid progress in April, now that "the slow process of getting the building staked out, supplies on hand and work organized [had] been completed." Concrete columns and piers were erected in June and most of the floor slab poured.[1]

On July 24, the contractors' work was inspected by Tom Vint, chief of design and construction, and Chief Safety Officer Baker, both of the Washington office. Problems were found with some of the columns, however; and a stop- work order had to be issued on August 6 when the contractor refused to stop pouring beams on rejected columns. Work resumed five days later when he finally agreed to remove the defective work.[2]

By the end of the summer, the east elevation had begun to take shape. A view from the

1. The construction process is well-documented by a series of photographs taken at the time. These can be found in a collection at the visitor center and another collection at park headquarters at Fort Raleigh.
2. "Completion Report of Project," February 2, 1961, contracting officer's files, CAHA Headquarters.

Figures 6 and 7 Two views of Visitor Center during construction, 1959. (WRBR Visitor Center Collection)

south shows the beams for the exhibit room standing apart from the office wing. The next month, contractors were laying the ribbed ceiling forms for the corrugated concrete overhang around the perimeter of the assembly room. The major concrete portions had been cast, and Mitchell/Giurgola may have witnessed some of this form work during their "field inspection" at the site on September 24 and 25.

A change order was issued on September 11, 1959, to allow construction of the patterned concrete wall at the entry terrace.[1] Form work for the patterned wall was well underway by October, using a steel grid to create the protruding shapes on the surface of the wall; and a wooden framework was still bracing it in January. After its completion, the design attracted a great deal of attention, with many questions as to its meaning. As the architects noted, however, "it means, simply, that concrete is plastic and may be effectively used to create almost any visual experience, this being one the architects believe to admirably suit the condition of structure, site, and deeds." It was designed, they said, "to give interest and dimension to an otherwise flat wall surface. The design itself is meant to be an expression of the plastic quality of concrete by means of well- defined profiles, recessions and protrusions, simply placed to form an integral pattern over the wall surface. The forms are related proportionally to the overall mass and are placed to achieve maximum dimensional quality at eye level."[2]

While the decorative wall was under construction, contractors were also assembling the arch beam forms of the dome. The general shape became visible in November; a plywood shell framed the central half sphere, and intricate interior scaffolding supported the dome framework throughout this construction. Engineer Don Nutt of EODC witnessed the "dome pour" later in the month. Smooth reinforced concrete covered the central portion

1. Ibid. "Completion Report" documents all change orders.

2. Statement from Mitchell/Giurgola, Wright Brothers files at CAHA headquarters.

Figure 8 View of nearly-completed building, prior to landscaping, April 1960 (WRBR Visitor Center Collection)

first. The contractors then turned to form work for the "flange overhangs," which were subsequently poured. The dome sat on four coupled columns and was "tied" at its base by four tension rods which remained exposed at the bottom of the large arched openings of the clerestory. By December the dome was complete and the supportive scaffolding had been removed.

Despite colder temperatures, contractors were able to pour the steps to the visitor center in January 1960. Chief of EODC Zimmer and Supervising Architect Cabot spent two days "reviewing progress and details" of the construction that month, and Don Benson and Ann Massey, both of EODC, visited the site to discuss color and design.[1] Interior framing was still exposed in February, but the dome, overhang, and exhibition area roof were considered complete.

A nationwide strike by steel- workers delayed delivery of the steel- framed window and wall panels, which were not installed until April, when engineer Don Nutt and landscape architect Ed Peetz (EODC) visited for a construction review. Sometime during the month the contractor made his third estimate for a completion date, settling on June 10. The final inspection of the visitor center took place on June 20, 1960. Evidently no major changes were required, although the final payment was not made to the contractor until January 25, 1961, after he had finally replaced some damaged plate glass.[2]

Specialists from the museum division were busy installing the twenty- two museum exhibits during the first weeks of July, when work also began on the surrounding landscaping. The contractors for "planting and miscel-

1. Dough, "Monthly Report," January 12, 1960; this team of interior designers worked at the Gettysburg Visitor Center and Cyclorama building in 1961.

2. "Completion Report," February 2, 1961.

Figure 9 View to north of Visitor Center, showing original fence and plantings designed to screen the parking lot from the Flight Path mall, 1962 (WRBR Visitor Center Collection)

laneous construction"- Cotton Brothers, Inc., of Churchland, Virginia- had replaced existing concrete walks and installed additional pathways by mid- August. Landscape work involved grading and spreading topsoil as well as "considerable experimentation and effort ... with native groundcovers."

After completing the walks, seeding, planting tubs and flagpole base, the contractors began work on the wooden fence. Progress was interrupted by Hurricane Donna, which struck September 11 and leveled sections of the fence, but repairs were accomplished by the end of the month. In addition, the contractors planted twelve varieties of trees and provided plants for inside the museum. Before the final inspection, Cotton Brothers installed the Park Service's signs and gate.[1]

The Wright Brothers Memorial Visitor Center was officially opened to the public on July 15, 1960. By all accounts, the building met with a positive reception. Superintendent Dough wrote that "hundreds of compliments have been received about the exhibits and the building's design since it was opened. Visitors are generally surprised to learn of the aeronautical principles formulated by the Wrights, and the descriptive term 'beautiful' is used repeatedly in describing the building." He also noted that, the two thousand visitors who passed through the visitor center every day during the summer season "are so well distributed during visiting hours that there are seldom over 75 visitors within the building at a time." During the month of August, the site received 62,177 visitors, a thirty- four percent increase since the year before (and approximately three thousand more visitors than would visit in August 1998). Although Dough

1. Cotton Brothers, Inc., the only party to bid on the project, received the contract for $34,228.11 on June 17, 1960. The final inspection was conducted on October 22, 1960. "Completion Report, Planting and Miscellaneous Construction, Wright Brothers National Memorial, Kill Devil Hills, North Carolina," n.d.

Figure 10 View of Visitor Center and parking lot, September 1962 (WRBR Visitor Center Collection)

seemed optimistic about these figures in his initial report, by September he had become concerned about the "too interesting" museum exhibits, which he blamed for causing congestion in the visitor center. On five peak days "3,500 plus jammed into the visitor center." Dough indicated that the Park Service had not expected such crowds until 1966, as shown by graphs included in their Mission 66 prospectus.

Rather than consider a building expansion, however, Dough suggested changing the exhibition layout: "More museum exhibits to further spread out the visitors may be the answer, but in our view the law of diminishing returns sets in when many more than about 19 exhibits are installed in a visitor center." Mission 66 planning documents indicate that the Park Service anticipated record numbers of visitors (nearly 90,000 per month by 1966) and judged the visitor center facility adequate to serve their needs. By that time, Dough had retired, and Superintendent James B. Myers assumed his post.

Dedication of the Visitor Center

By the end of September 1960, the wooden fence shielding the parking area from a clear view of the first flight markers and buildings was completed. In preparation for the dedication, landscape architect Lewis from EODC "inspected new planting and miscellaneous construction," and the Park Service's supervisory architect, Judson Ball, reviewed the state of the visitor center." The walks from the visitor center to the camp buildings and the main entrance gate were complete. The information desk for the lobby was delivered and installed, and planning for a permanent display of a Wright glider replica was complete. There had been plans to suspend the glider from the ceiling, but in order to save money, a simple, cypress- paneled platform resting on a circular gold carpet became the glider's pedestal.[1]

1. Andrew, M. Hewes, Wright Brothers National Memorial: An Administrative History (Washington. DC, 1967), p. 93. This installation is also documented in period photographs in the Wright Brothers Visitor Center collection.

Figure 11 Twilight view of Flight Room and Ceremonial Terrace, c. 1962 (WRBR Visitor Center Collection)

The Wright Brothers Memorial Visitor Center was dedicated on December 17, 1960, the fifty- seventh anniversary of the first flight. According to one news account, a "slim audience saddened by Friday's airliner collision over New York and Saturday's crash at Munich" attended. One of the most memorable moments of the event was a speech by Maj. Gen. Benjamin D. Foulois, who actually had watched the Wright brothers test their early planes and had flown the country's first army aircraft. Local papers covering the dedication had only compliments for the new visitor center building, and by early December over one hundred thousand visitors had already passed through its doors.

If the Wright Brothers' legacy was the main focus of dedication day, over the next few years the visitor center building would become the subject of its own articles and press releases. *Progressive Architecture* had given notice of the design in 1959 and in 1961 included a floor plan, photograph of the finished building, and close- ups of the concrete wall and terrace design in its profile of "the Philadelphia School."[1] Two years later, the "Kitty Hawk Museum" was a feature of the journal's August issue. The building received praise for its orientation and planning of interior spaces that "make visiting this national park an aesthetic as well as an instructive experience."[2] Washington Post architectural critic Wolf Von Eckardt called the visitor center a "simple, but all the more eloquent, architectural statement that honors the past precisely because it does not ape it." The Wright Brothers Visitor Center was also sin-

1. Rowen, "Wanting to Be: The Philadelphia School," *Progressive Architecture*.
2. Kitty Hawk Museum, *Progressive Architecture* 44 (August 1963): 112-117.

Figure 12 View of entrance to Men's Room, showing original exterior materials, March 1975 (CAHA Contracting Files, Ft. Raleigh)

gled out in "Great Builders of the 1960s," a special section of the international publication *Japan Architect* (1970); in the A.I.A. Journal's 1971 assessment of Park Service design, "Our Park Service Serves Architecture Well"; and as an example of excellent government- sponsored architecture in The Federal Presence (1979). The fact that Mitchell and Giurgola were hardly household names in the early sixties, even in professional circles, speaks eloquently of the building's enthusiastic reception by the popular media.

Later Modifications

There were modifications to the building at an early date. The office space had originally been constructed with a "movable wall" dividing the space between the superintendent's office at the north end and the clerk's and historian's office at the south. The wall has remained in place, but in the 1960s both spaces were subdivided further by the construction of additional walls that brought the plan of the offices to their present configuration.[1]

The least visible but most extensive alterations to the building involved heating and air conditioning. The air circulation system required improvement almost immediately. Bids were opened for the work in October 1962, and E. K. Wilson and Sons, Inc., was awarded the $5,684 contract. Repairs included the installation of two flow meters and "three- way diverting valves in each of three zones to divert hot and chilled water from units coils."[2] In October 1968, further work was performed to upgrade the mechanical systems. The existing heat pump and associated piping and an old, three- hundred- gallon water tank and twenty- five- gallon compression tank were removed and a new hot water boiler installed.

In 1963, arrangements were finally completed for procurement and installation of a replica of the Wrights' 1903 bi- plane, which was unveiled in December. It was an instant hit,

1. The exact date of the alterations to the offices has not been documented but the character of the materials suggests that it occurred within a very few years of the building's original construction.
2. "Bids Have Been Mailed for Wright Center Work," Coastland Times (October 5, 1962); "$5,684 to be spent on Visitor Center Repairs at K.D.H.," Coastland Times (November 9, 1962), park archives.

even though its presence on the floor with the 1902 glider often crowded the large groups of schoolchildren and others who regularly visited the site.[1]

In 1972, the built- up roof was extensively repaired, including replacement of the white marble chips with which the roofing was finished. No other significant work has been documented in the early 1970s, except for the installation of carpet throughout most of the building in 1975. It is not clear when the original metal- grid suspended ceiling in the Lobby was replaced by the present acoustical- tile suspended ceiling, but that may not have occurred until the 1980s.[2]

The most significant alteration to the original design was executed by East Coast Construction Company, Inc., from Florida, who were awarded the contract for the refenestration of the building in May 1975. The project included replacing all of the original steel-framed windows and doors with aluminum-framed units that eliminated the hopper- type ventilating sash in favor of large fixed- sash throughout the building. In addition, the main entrance to the building was relocated to the northernmost bay on the east side of the Lobby, and all of the door openings were enlarged to a width of 3 feet.[3]

Part of the project included covering the numerous cypress panels that originally helped characterize the building's exterior. These were covered by the existing extruded aluminum panels, manufactured by Kawneer Architectural Products. Marketed under the name of "Shadowform," these panels featured a baked- on silica finish that was meant to imitate the look of concrete, according to the company's marketing information, although that effect is lost in the present stark- white color of the panels.

Perhaps the most dramatic change to the appearance in 1975, however, was a matter of color. The original steel window frames and mullions were bright orange, a choice of color that drew attention to the glass areas of the walls and dome. Architect Don Benson recalls that Ann Massey chose the color to add warmth to the building.[4] The dark bronze color of the new windows and the location and size of the wide ventilator bar resulted in marked visual differences.

While the fenestration project was underway, the park considered a much greater change to its visitor center: the addition of an auditorium and museum extension to the north end of the building. In 1977, the MTMA Design Group of Raleigh, North Carolina, produced a full set of construction drawings for a semi- circular addition. Viewed from the south, the building would appear unaltered, but a circular audito-

1. Hewes, p. 93. Except for her reference in this administrative history, there is no evidence that the glider or the plane were ever suspended from the flight room ceiling.
2. The superintendent's annual reports are erratic in their documentation of physical changes to the building. Carpeting of the building in 1975, e.g., is mentioned while the refenestration of the building around the same time is not mentioned.
3. Plans and specifications for this project can be found in the contracting office's files at park headquarters.
4. Interview with Donald F. Benson by Allaback, March 9, 1999, Lakewood, Colorado; Benson owns four different postcards of the exterior of the building printed in the early 1960s.

rium was proposed for the north side of the building. A circular display space for the glider was included within this area, as was a door into the auditorium. The exterior of the addition continued the general pattern of the building's facade, with rope texture concrete areas separated by panels of wood siding and sandblasted, textured areas of concrete. On June 26, 1978, the park sent out an invitation for bids on construction of the addition, along with an expansion of the parking lot and related work. Total costs were estimated at between $250,000 and $390,000. Bid and re-bid, the addition was never constructed due to lack of funds.[1]

Some improvements were made to the Visitor Center, however, including installation of a handicapped- accessible ramp in 1979 and expansion of the parking lot to accommodate increased RV traffic in 1980. Hand rails were added to the terraces in 1984, and, about that time, the park partially enclosed the employee parking lot on the northeast side of the building with a wood fence similar in appearance to the fencing along the visitor parking lot. Alterations to the restrooms probably occurred at this time as well and included the addition of handicapped- accessible stalls, new stall walls, changing tables, and a new epoxy- composition floor and base.

In the fall of 1982, the original built- up roof covering was replaced by the existing foam roof covering. It is not clear how the decision was made to replace the roofing, but urethane-based technologies were popular at that time as a cheaper alternative to traditional flat- roof repairs. Two alternates- - one for removing and one for covering the original roof- - were requested from bidders at that time, but it is not clear which alternative was accepted. Park Service personnel present at the time recall that only part of the old roofing was removed. In addition, the four glass- block skylights over the rest rooms were removed and replaced by the present acrylic "bubble" skylights.[2]

The new roofing came with a five- year warranty, although the Park Service had been told it would not need recoating for ten years. However, the roofing appears to have been inproperly installed and began leaking almost immediately. As early as September 1983, the Park Service complained to the contractor about leaks, but even after recoating in 1987, problems continued, culminating in the total failure of the roof covering over the lobby by the late 1990s.

In addition to the ongoing problems with the roof, it was determined that the original acoustical finish on the Flight Room ceiling contained asbestos. As a result, in the spring of 1987, the room was closed, the old coating removed, and the present sprayed acoustical coating applied.[3]

In 1989, the building's HVAC system was rehabilitated and expanded. This work resulted in the loss of the two windows on the north side of the Flight Room where two exterior bays were enclosed to house mechanical

1. Plans and specifications for this project can be found in the contracting office's files at park headquarters.

2. Plans and specifications for this work were not extensive.
3. Plans and specifications for this project can be found in the contracting office's files at park headquarters.

Figure 13 View of south end of Lobby showing original materials, March 1975. (CAHA Contracting Files, Ft. Raleigh).

equipment. A new air- duct system was installed around the perimeter of the Flight Room. The new ducts were covered by a soffit that extends the line of the exterior soffit several feet into the room, obscuring some forty percent of the corrugated concrete ceiling.

In most respects, the building's patterns of use have changed little over the last forty years. Visitors continue to enter the building through the lobby and migrate into the museum area before entering the assembly room and hearing the ranger's interpretive presentation. On the east side of the building, administrative offices, most mechanical and electrical equipment, restrooms and other service areas continue to occupy their original spaces. It was, however, necessary to partition the offices at an early date, and more recently low partitions have been installed in one office to accommodate an increase in staff at the site.

One modern use of the building that was not considered in the original design is the merchandising and sale of books and souvenirs, and accommodating this use has necessitated regrettable changes in the way the building is experienced. Visitors originally entered the lobby to face a wall of windows looking out over the ceremonial terrace to the flight markers beyond, but even in the 1960s, "concessions" were being sold out of the Lobby. The extent or nature of these items has not been documented, but sales continued to grow. Today, the Lobby is occupied by a bookshop and an adjacent information desk, and, although the wall of windows and set of double doors still form the facing wall, the view is blocked by shelves, postcard displays, and Park Service personnel. One set of doors to the Ceremonial Terrace was closed in the 1980s, and visitors are less likely to use the remaining doors, which are now practically behind the information desk. As 1960s photographs illustrate, the original lobby and exhibit area flowed together in a single spacious and airy room, but today this sense of openness is compromised by the additional furnishings.

When Ehrman Mitchell re- visited the Wright Brothers Memorial Visitor Center in the mid-1990s, he was, according to Dr. Allaback, "astonished" by the changes that had taken place since its dedication over thirty years earlier. He was also "particularly bothered" by the new fenestration and the metal sheets covering the exterior cypress panels, which remain the most- significant alterations to the building.

During the 1990s, pressure grew to replace or expand the visitor center, which is now overwhelmed by the numbers of visitors, especially in the summer months. Only recently has an interest in the preservation of landmarks of modern architecture become widespread, and only in 1998 was the visitor center listed as a contributing building in the National Register district at the Wright Brothers Memorial. On January 3rd, 2001, the Wright Brothers Visitor Center was designated a National Historic Landmark.

Physical Description

Figure 14 Wright Brothers Visitor Center, southwest elevation (National Park Service, 2000).

The visitor center is a one- story, reinforced- concrete, steel, and glass structure with an asymmetrical plan. Set on a raised concrete platform, this Modernist building includes the domed Flight Room (or "assembly room"), which is situated at the northwest side of the building and is its most prominent feature. The Flight Room is flanked by two parallel, flat- roofed, rectangular blocks, which occupy most of the eastern half of the building platform. The central block contains the Lobby and Museum; the easternmost block, which has a slightly lower roof, contains the offices, rest rooms, and mechanical room. At the southeast corner of the building platform is the Entry Terrace and, at the southwest corner, the grade- level Ceremonial Terrace.

Editor's note:

This section contains a systematic accounting of all features, materials, and spaces according to age, significance, and general integrity. A detailed inventory of individual building features is included in the Appendix D.

Much of the original sequence of construction can be documented through a collection of now- historic photographs in the offices of the visitor center. Original drawings, specifications, contract documents, completion reports, and other documents are collected at the headquarter offices and museum collections

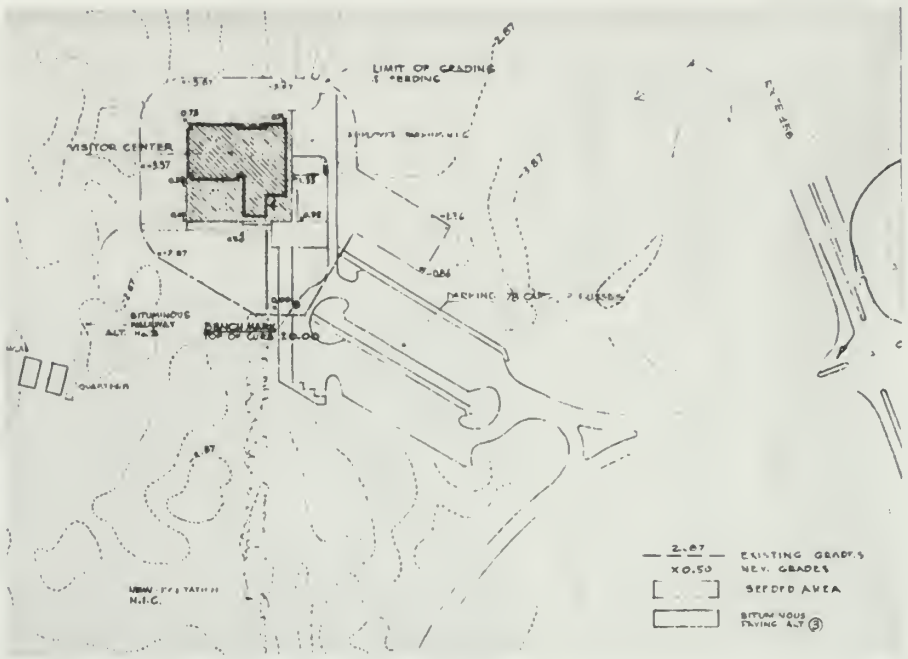

Figure 15 Site plan of vicinity of visitor center from 1958 Mitchell/Giurgola plans

of CAHA at Fort Raleigh, NHS. All of these sources have been consulted and, with the historic feature inventory and condition assessment conducted by Jack H. Pyburn, A.I.A., in 1999- 2000, help inform the following description of the existing building.

Character-Defining Features

The building's principal character- defining features remain intact and should be considered significant, including its massing and profile, most of its architectural details, and its distinctive original materials. The primary materials from which the building was constructed are wood, concrete, and steel. The structural poured- in- place concrete, with bush- hammered surfaces, is used as a primary finish material both on the inside and out. Structural bays were differentiated with channel- groove cypress paneling combined with steel window casements, which were originally painted orange. Both the window mullions and the wood panels have been replaced or covered at all locations on the exterior.

The building massing and profile were designed to express both the profile of the dunes (the dome of the Flight Room) and the sand flats (the low flat roof of the building) and to reference flight (the arched overhang of the Flight Room dome). In the open expanse of the setting, this volumetric presentation is both pleasing and compatible with the profile of the adjacent landscape without being dominant or distracting. The arched overhang of the Assembly Room roof and the deeply- set glass curtain wall acknowledge the dramatic summer sun angles and harsh temperatures.

On the interior, nearly all the spaces in the building are original and primarily in their original configuration. The building was designed to produce a sequential experience for

the visitor, beginning with the visitor's entrance onto the building platform at the Entry Terrace and continuing through the Lobby, the Museum, and the Flight Room to the visitor's exit onto the Ceremonial Terrace. These are all character- defining spaces that should be preserved. Certainly, the Flight Room with its views, its domed and ribbed ceiling, and its full- scale models of the Wrights' glider and plane is the most character- creating space in the building. The Museum, with its custom-designed cases and architecturally integrated displays, is the least- altered of the primary spaces. The Lobby, with its views to the flight path and its interrelationship to the other areas, is the third character- defining space.

Site

Since the original design of the visitor center was intended to blur the distinction between the building's interior and exterior, note should be made here of a number of features that contributed to its unique relation to the site.

The 431- acre site of the Wright Brothers National Memorial is located in Kill Devil Hills, Dare County, on the Outer Banks of North Carolina, about four miles south of the older community of Kitty Hawk and about seven miles north of the historic coastal village of Nags Head. The topography of the site is flat, predominantly open terrain punctuated by two vegetated sand dunes, Kill Devil Hill and West Hill. Bisecting the site is a two thousand-foot- long, grassed mall located north of Kill Devil Hill, bounded on the east and west by drainage ditches. The visitor center itself is located along the eastern edge of the mall about two thousand feet northeast of the Wright Monument (1932) atop Kill Devil Hill and approximately seven hundred feet from the park's main entrance (1958) at NC Highway 158.

In siting the visitor center, the Park Service deliberately oriented the building to make it an integral part of the visitor's experience and of the park's interpretation of the historic site. The design and siting of the building are such that the historic monuments and the site of the

Figure 16 View of fence along east side of employee parking lot (National Park Service, 2000)

Wrights' first flight are visible from the visitor center itself. Both the main drive from Highway 158 and the orientation of the parking lots direct the visitor to the visitor center and not to the monument on Kill Devil Hill, which had previously been the focus of the site. The visitor arrival alignment is a significant feature of the design concept for the visitor center. The entry drive and parking alignment are askew to the approximately perpendicular relationship of the visitor center building to the axis of the flight path and the monument. Once visitors exit their vehicles, they are directed to the primary walkway to the Center. The approach walk aligns with the Entry Terrace at about forty- five degrees; in the original design, a ninety- five foot closed- slat fence obscured the visitors' approach view of the flight path markers. As a result, visitors did not become engaged with the primary historical features until they entered the visitor center, at which time the relationship became more formal. In the open environment of the barrier island, this control of the entry experience and interior building views served to increase the drama and intensity of the interpretative experience for the visitor. A less controlled experience would likely result in a diffused and disjointed set of observations that would diminish the impact of the story to be told. In addition, the fencing and the angle of alignment that directed the entry experience away from views of the primary site features served to shield views from the flight- path mall to the parking lot and more- distant residential and commercial development to the east.

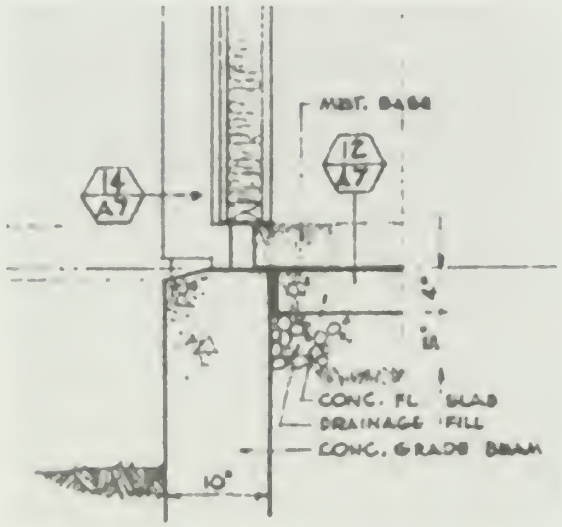

Figure 17 Detail of typical grade beam around perimeter of building from 1958 plans

Fences: Cypress fences were part of the original plans, flanking the building on the south and east sides. Although the fences are covered more comprehensively in the Cultural Landscape Report, they were an integral part of the original concept of controlling entrance into the visitor center (and the interpretative experience as well). The fences were constructed of 2 x 3 palings attached to 2 x 6 and 2 x 12 rails with the rails bolted to metal 5W14 posts set into raised concrete piers.

The fence from the south side of the building along the west side of the parking lot was damaged by Hurricane Donna in September 1960 but was immediately rebuilt. It was extended when the parking lot was expanded in 1980 before finally being removed in 1998. Its removal disrupted the intended entry experience and also exposed the parking lot and the highway to view from the mall.

A shorter, original fence still extends perpendicularly about 46 feet from the east side of the building and screens the staff parking lot from view of arriving visitors. Although the wood fencing is in good condition, failure to maintain protective coatings has allowed significant deterioration of the metal fence posts. A gate originally closed the raised walk on the east side of the building between the employees' office entrance and the entrances to the rest rooms. A hole in the concrete pier opposite the west end of the present fence appears to have accommodated a sliding barrel lock. Visitor access to the walkway north of the rest rooms is now blocked by a wooden sawhorse.

There are three fences that mimic the original design but that were added within the last twenty years. One screens the non- original HVAC unit condenser and an above- ground fuel tank at the northeast corner of the building. The second is a fence along the east side of the staff parking lot. The third screens utility equipment east of the staff parking lot. All three of the non- contributing fence/screens have slats similar to the original design but with posts that are pressure- treated 6 x 6's.

Building Platform: The building is set upon a poured- concrete platform, elevated about 18 inches above the surrounding grade. The platform is L- shaped and, with the Ceremonial Terrace in its southwest quadrant and the grade- level walk at the northeast side of the building, forms a rectangle that measures approximately 128 feet north to south and 137 feet east to west. In addition to the building itself, the platform includes two significant spaces:

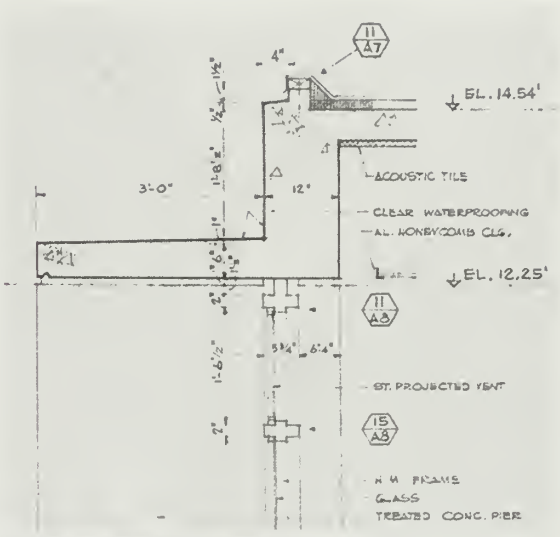

Figure 18 Above, typical section through flat roof and canopy, from 1958 plans

Figure 19 Left, detail of typical pier showing exposed-aggregate panels with smooth-troweled border (National Park Service, 2000)

the Entry Terrace and a raised walk that extends around part of the building.

The raised Entry Terrace is located in the southeast quadrant of the building platform and forms the main visitor's entrance into the building. Approximately thirty- two feet square, the Entry Terrace is approached by three concrete steps that run the full width of both its south and east sides.

In addition to the Entry Terrace, the raised platform base of the building includes a concrete walkway which connects the two terraces along the south side of the building and wraps

Figure 20 Above, view of concrete paving of Ceremonial Terrace, showing original exposed-large-aggregate panels to right, and the brush finish of modern repairs at left (National Park Service, 2000)

Figure 21 Below, view of original, cast-concrete, water fountains on northeast side of entry terrace. Note original circular pavement at grade and modern ramp and railing. (National Park Service, 2000)

the east and north sides of the Ceremonial Terrace. A walkway also extends past the rest rooms to the north of the Entry Terrace before descending by two steps to grade level and continuing north along the east side of the building.

Delineation of different parts of the platform is accomplished in part by the use of different finishes on the original concrete. The Entry Terrace is paved with 5' by 5' offsetting squares of exposed- aggregate concrete (aggregate up to about ½" diameter) similar to that used on the grade- level Ceremonial Terrace. A finer, exposed- aggregate finish (up to about ¼") was used for the walkways and steps and for the panels that surround the two terraces. Failure to match these finishes while making repairs and installing hand railings has compromised the visual integrity of the platform.

The design and materials of the Entry Terrace have been compromised by the addition of a concrete, handicapped- accessible ramp at its northeast corner and metal hand- railings along both sides of the terrace. These installations and other repairs elsewhere on the platform use a standard, brush- finished surface without exposed aggregate, making them quite different from the original in both color and texture.

Ceremonial Terrace: Inset into the southwest corner of the building platform is the "Ceremonial Terrace," as it was designated on the original plans. Located at grade level and flanked on the north and east sides by steps from the building platform, this area was de-

signed to be the focal point for the building's more- formal events. With a natural staging area on the building platform, the terrace and surrounding lawn could accommodate seating for several hundred.

The Ceremonial Terrace is paved with 5' by 5' offsetting panels of exposed- large- aggregate concrete and measures about 47'- 8" east to west and 53'- 6" north to south or about 2,550 square feet. A modern concrete handicapped-accessible ramp and metal hand- railing have been installed along the west side of the terrace to the door at the southwest side of the building. Metal safety railings have also been installed at four other locations on the east and north sides of the terrace. All features remain in good condition, although the design and installation of the ramp and railings have compromised the historic integrity of the Ceremonial Terrace's design and its materials.

Other Features: A wooden bench, approximately 51 feet long, was an original feature along the south side of the platform between the Entry Terrace and the Ceremonial Terrace (see 1958 drawings, Sheet A9). Although still a feature of the site, the bench has been modified through total redesign and replacement of its wooden components, with only the concrete support piers remaining from the original installation. Early photographs prove that the original design was constructed but also show that, by the 1970s, red- painted metal covered the horizontal top of the bench.

An original feature that still survives intact is the poured- concrete water fountain that was designed for the east side of the Entry Terrace near the rest rooms. No longer operative and now beginning to deteriorate, the fountain features two concave, squarish bowls, one accessible from the Entry Terrace and the other accessible from a semi- circular, ground- level, concrete pad along the east side of the Terrace.

Cast- concrete planters were originally designed for the platform on the east and north sides of the Ceremonial Terrace. Now missing, these planters measured 3'- 6" square and 1'- 9" high and were originally planted with common fig (*Ficus carica*).

Utilities: The building was originally supplied with water from a drilled well located to the northeast of the building. According to the completion report, "obtaining a satisfactory water supply proved to be a major problem. This was due to the unpredictable nature of the ground waters on the outer banks—there was little correlation between test and construction wells." As a result, a second well had to be drilled before a satisfactory water supply was finally obtained. Today, water supply is from the Kill Devil Public Water System.

The visitor center's original electrical service was above- ground, entering the building from a wooden pole near the southeast corner of the parking lot. Telephone lines also entered from this pole, including one to a metal- and- glass phone booth outside the men's rest room. These services have since been relocated underground, and the phone booth has been removed.

A septic- tank system is located east of the Entry Terrace beyond the service drive, with a drain field that appears to parallel the northeast side of the parking lot (see 1958 drawings for details of layout).

Exterior

The exterior of the building is in generally fair condition. Exceptions include serious problems with the roof covering, areas of spalling and deteriorated concrete on piers and some of the fascia, and deterioration of the building's plaster soffit. In addition, the historic character of the exterior has been compromised by the replacement of the exterior wood siding and the replacement and reconfiguration of the windows and doors, all of which occurred in the late 1970s.

Foundation: Although there has been no excavation or other investigation of the foundation to determine its as- built or its present condition, the building appears to have been well founded, and with the exceptions of some settlement of the floor slab (see below), no significant structural problems have been observed. According to the original plans, "the structure is to be supported by 20- ton creosoted wood piles," meaning that the piles were to be driven to a depth that would allow them to support 20 tons of dead weight. On top of these piles were laid grade- level reinforced-concrete beams (generally 8 inches to 12 inches thick), which were set with bottoms a minimum of two feet below the level of the finished, concrete, floor slab. Between the beams and the reinforced- concrete walls that form the perimeter of the building's platform, 4 inches of crushed stone was to be used for fill under the reinforced- concrete slabs that form the floor of the building.

Structural System: The primary structure is formed by steel- reinforced, poured- in- place concrete which is also the primary exterior finish and a significant interior finish as well. Concrete piers resting on the grade- level concrete beams support 12" by 26", reinforced-concrete ceiling beams and the reinforced-concrete roof slabs.

The architects described the dome above the Flight Room as "a transitional thin- shell concrete roof with opposed thin- shell overhangs connecting the perimeter of the structure to form a complete monolithic unit." The dome, which is generally 3- inches thick, is supported by four pairs of concrete columns that are prominent interior features in the Flight Room. The broad, concave, overhanging eaves of the dome are also of thin- shell concrete construction.

Different finishes were specified for all exposed concrete. Board- marked surfaces were specified for exposed vertical surfaces of roof and grade beams, where #1, 1 x 10 form boards were used. The exterior face of the north and east walls of the mechanical room and of the south wall of the women's rest room were also to be board- marked, using 6- inch or wider form boards. The projecting overhang of the dome was formed with plywood and, thus, had no board- marked surfaces.

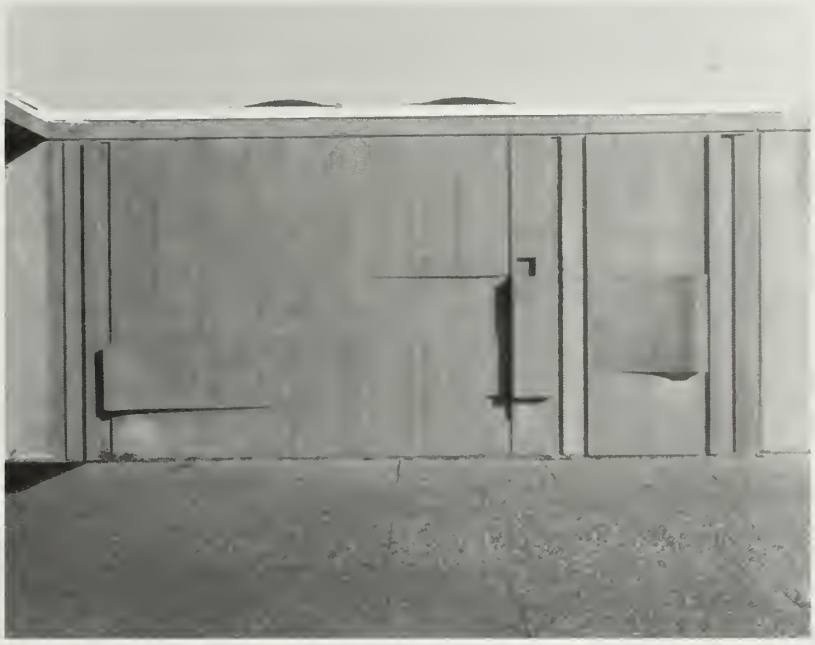

Figure 22 View of patterned concrete wall on entry terrace (National Park Service, 2000)

On the interior and on the exterior, the concrete piers were finished with exposed- aggregate faces and smooth- troweled edges, a treatment that is one of the building's significant features. Exposed columns in the Flight Room had smooth finish surfaces. A patterned finish was specified for the wall along the north side of the Entry Terrace and is, with the thin-shell dome, one of the building's most dramatic features.

The original specifications also called for all exterior above- grade concrete to be treated with two coats of "Hydrocide S- X," a colorless waterproofing coating. Otherwise, all exposed concrete was to remain exposed and unpainted.

Most of the exposed concrete in the building is in good condition. Serious deterioration has been noted only in a few isolated areas of the roof and dome fascia on the south side of the building and in a column base on the west side of the building. However, the appearance of the entire exterior face of the dome has been compromised by the recent application of the same material that was used to recoat the roof of the building.

Reinforced- concrete floor and roof slabs are generally covered and could not be closely inspected. Along the north sides of the Flight Room and of the Museum, the floor slab has settled two to three inches, and there has been some settlement at the south end of the Lobby. Further investigation will be necessary to determine the extent of deterioration, if any, to the roof slab due to ongoing leaks in the roof covering.

Windows and Doors: The open concrete framework of the building is infilled with recessed, non- load- bearing curtain walls. Originally, these curtain walls were of two kinds:

full- height, steel- framed window- walls and solid, wood- framed, wood- paneled walls. According to the original specifications, the exterior door and window frames were to have been custom- made using 14- gauge, cold-rolled steel furniture stock. Glass was specified as $^{1}/_{4}$" or $^{5}/_{16}$" plate glass (uninsulated), with the thickness depending on the size of the glazed area.

In the Lobby and Flight Room, the windows were full- height and included an outward-opening, hopper- type, ventilating sash at the bottom of each window section. In the Lobby, an *inward- opening*, hopper- type, ventilating sash was also used at the *top* of each section. Steel- framed, bronze- mesh screens were specified for all ventilators, with wicket- type screens used for outward- opening units and fixed- type screens for inward- opening units. In the dome clerestory, the large openings, which are 40 feet long and rise to 6 feet in height, were also fitted with steel- framed fixed windows. In the window openings on the east side of the building, windows were not full-height but still included hopper- type ventilators below larger fixed panes of glass. The window units were set approximately 2'- 6" from floor level above 2- inch- thick, cementious, insulating panels with small, air- intake louvers below.

The steel frames were to have received a factory- applied, baked- enamel finish prior to installation and were then painted a bright orange that provided the building with one of its most distinctive features. The insulating panels and doors on the east side of the building were green (see "Historic Paint Finishes Study" in Appendix B).

In 1976 the original steel- framed windows and doors were replaced with the existing, anodized- aluminum, window- and- door system, manufactured by Kawneer Architectural Products. The present window system did not replicate the composition, profile, or color of the original system, whose hopper- type ventilating windows and prominent orange color were among the building's more significant features. The present window system uses double- pane, insulated glass which was tinted "equal to 'Solargray'," according to the specifications. This greatly reduced natural light levels on the interior and combined with the dark "bronze" finish of the aluminum frames to dramatically alter the building's historic appearance on the interior and the exterior. Finally, the placement of the ventilating bar in the present window system significantly obstructs the views from inside the building, particularly for visitors seated in the Flight Room.

In replacing the original windows and doors, the present system also altered the dimension and placement of exterior doors, which were replaced with metal- framed, store- front doors on all but the east side of the office block, where solid, metal flush doors were used. Although the original openings from the Lobby and Flight Room to the Ceremonial Terrace were reinstated, the double doors at the main entrance were moved one bay to the north of their original position. Since the 1970s, one of the two pairs of double doors that opened off the west side of the Lobby was

eliminated entirely. The doors on the west side of the Assembly Room that appeared in some of the architects' early sketches were apparently not included in the original construction of the building.

On the office block on the east side of the building, the original doors were wooden, flush doors. Doors were to be 1 ¾ inch thick, solid- core, veneered with birch or gum, and with metal louvers set into the lower part of each door. Doors ranged from 2'- 8" to 3 feet and were 8 feet high. In addition, the exterior double doors from the offices on the east side of the building had single lights, 6" by 21", set at eye- level in each door, like the interior doors that remain between the offices and the museum. All of these doors were replaced with the rest of the windows and doors in 1976, although the original openings were not altered. The existing doors are flush, aluminum- faced doors, which were painted after installation.

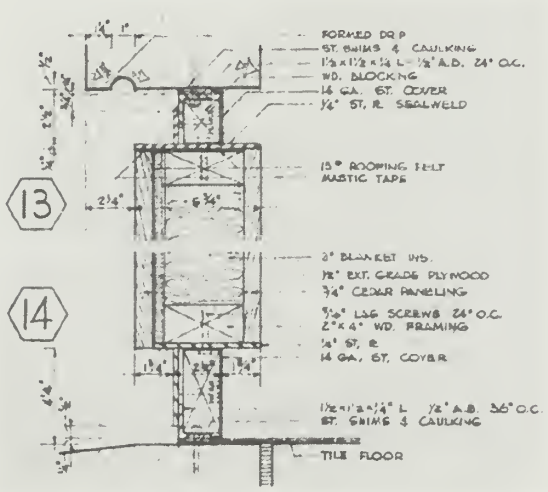

Figure 23 Above, typical, exterior wood-wall section as depicted on 1958 plans

Figure 24 Below, view of southeast corner of lobby wing, 1961. Note typical channel-groove wood siding at left and, in foreground, original wooden rail. The rail, which later became a bench, is no longer extant. (*Progressive Architecture*, April 1961)

Wood Curtain Walls: In addition to the steel- and- glass curtain walls, there was also a series of wood- framed curtain walls on the exterior of the original building. These wooden walls appeared at the south end of the Lobby, along the east side of the offices, and all along the north side of the building. According

Figure 25 Above, view of northwest corner of building showing modern window system at right, white "Shadowform" panels and infilled window bays on north side of building at left (National Park Service, 2000)

Figure 26 Below, view of typical custom-designed light fixture in Flight Room (National Park Service, 2000)

to the original plans, the wood- framed walls were to have been insulated, sheathed with ½" plywood (exterior grade CC), and finished on the exterior with ¾" cedar "paneling." The channel- groove, cedar boards that were specified were to be installed with a ½" reverse-batten- type reveal between the 3- inch face of each board. However, the written specifications for the project do not mention cedar but instead specify "Tidewater Red Cypress, Clear Heart finish" for all paneling. A contemporary account in *Progressive Architecture* (August 1963) also describes the paneling as being "prefabricated panels of silver- gray cypress boards in orange- baked- enamel frames fastened to the piers," and early photographs clearly show this installation.

In 1976, in conjunction with replacement of the building's windows and doors, the exterior wood paneling was covered by the existing extruded- aluminum panels. Marketed under the name of "Shadowform" by Kawneer Architectural Products, who also produced the present window- wall system, these panels are finished with a white "Silica Bond" coating that was meant to mimic the appearance of textured concrete surfaces. The loss of the vertical wood paneling on the exterior is, with the window replacement, one of the most significant alterations to the structure's historic appearance.

When the present HVAC system was installed in 1989, the building was altered again. The most visible change on the exterior was the removal of the two full- height windows on the north side of the Assembly Room. Closure of

the openings included enclosing the open pier- flanked bays on the outside for use as closets for additional mechanical equipment. The present exterior walls in those areas have a modern exterior finish and insulation system (EFIS) with metal double doors.

Soffit: Plaster- on- wire- lath soffits appear between the exterior concrete piers at all recessed window and wall panel locations. An original feature of the building, the soffits contain recessed lighting (no longer in use), air-intake louvers, and movable access panels that provided access to the fan- coil units from the building's original HVAC system. Although essentially intact, the soffits are badly deteriorated in a number of locations. They were originally painted a pale yellow.

Roof Covering: The original roof covering for the building was a built- up, tar- and- gravel roof that was insulated with 1 ½- inch rigid, asphalt- coated, fiber board. Metal flashing, counter- flashing and gravel stops were to have been made from 16- ounce cold- rolled copper, some of which is visible in early photographs of the building. Specifications for the roofing gravel called for "white stone chips" graded from $^{1}/_{4}$" to $^{5}/_{8}$" and these appear to have characterized the roof until the 1980s.

Although the composition of the various coatings on the roof has not been investigated, documentary evidence suggests that the original built- up roofing was at least partially removed in 1982 when the present urethane-based covering was first installed. Portions of the original copper flashing have also been replaced with aluminum and the urethane coating has been indiscriminately applied to parts of the concrete structure. The covering over the Lobby roof deck has failed completely and now fills with water that drains slowly into the building around the northeast corner of the Lobby. Frequent repairs to other parts of the roof have been necessary to stop less- extensive failure on other parts of the building.

The original drawings indicate a glass- block detail for the skylights within the visitor center public bathrooms. The original specifications, however, call for "'Toplite Panels' manufactured by Owens- Illinois or an approved equal." No precise documentation for the appearance of these original skylights has been located and the original shafts appear to have been rebuilt as part of the 1982 roof work. Apparently, all four skylights were replaced by the present acrylic "bubbles" in 1982.

Lighting: The lighting of the building's exterior was an integral part of its original design and provided a dramatic accent to the architecture of the building, especially when viewed from the mall. The north, west, and south sides of the Assembly Room were washed with light from a series of twenty- one recessed "down" lights that were placed in the exterior soffit. In addition, the projecting overhang of the dome was washed by pairs of flood lights, now missing, which were mounted on the roof at each corner of the dome. No lights were specified for the west side of the Lobby wing, probably so as not to diminish the impact of the lighting of the Flight Room. At the Entry Terrace, double flood lights were mounted on the pier to

Figure 27 Lobby and information desk, with cooperative association bookstore (National Park Service, 2000)

the left of the present entrance doors (originally, there was no door in that location) and were meant to provide lighting for the sculpted wall. On the east side of the building, single flood lights were mounted on the piers near each of the doors to the two restrooms and the office area, but these have since been replaced.

Interior

The interior of the building is in generally good condition although carpeting and some other finishes are worn and there are isolated areas of water damage due to roof leaks. Most of the historic interior features and finishes remain intact (excepting painted surfaces and most floor coverings). Of particular interest is the Museum area, which has been altered less perhaps than any other area of the building. There were alterations to the exhibits in 1984 and again in 1989, but the original exhibit design and most content have been maintained since 1960. Floors throughout the building were carpeted in 1975, except in the old superintendent's office, the mechanical room, and storage closets. The historic character of the Flight Room was significantly altered during changes to the building's HVAC system in 1989, which included closure of the two large windows on the north side of the room and installation of a new soffit to hide ductwork that was run around the perimeter of the room. In addition, replacement of the windows and doors throughout the building in 1976 significantly altered the lighting of the interior as well as the relationship between the interior and the exterior of the building.

Floor Plan: The irregular L- shaped plan of the building, which extends about 129 feet north to south and the same distance east to west, encompasses just over 9,000 square feet of floor area. Except for the early partitioning of the office block to create an office for the

site administrator, the original floor plan remains completely intact and, except for the closure and relocation of some exterior doors, the relationship of the spaces to each other and to the outside remains as well.

Entrance into the building is from the Entry Terrace on the east side of the Lobby. From the Lobby, visitor traffic circulates through the Museum before entering the dome- roofed Flight Room and then exiting the building onto the Ceremonial Terrace. On the east side of the building are administrative offices, a staff restroom, and utility closets, as well as a large mechanical room at the northeast corner of the building. Two public restrooms are also located on the east side but are accessible only from the exterior. Finally, two, small mechanical rooms were recently created in what had been open bays on the north side of the Assembly Room.

Lobby (1280 s.f.): Designed and designated as a "Lobby" in the 1958 plans, this space now also functions as a book store for the park. Changes have occurred to the floor covering, the suspended ceiling, finishes, and lighting. The original information desk on the east wall has been removed entirely as have the other original furnishings and drapery.

Walls: The walls of the Lobby combine a variety of materials and treatments. In addition to the glass curtain walls that characterize all of the west, most of the east, and part of the south walls of this space, exposed structural concrete piers frame the bays on the east and west sides of the space. These feature the same exposed-

Figure 28 Above, view of original main lobby entrance, 1962 (WRBR Visitor Center Collection)

Figure 29 Below, view of original information desk on east side of lobby, 1963; no longer extant.(WRBR Visitor Center Collection)

aggregate face and smooth- troweled edges that are found on the exterior piers, but the smooth edges of the piers here have now been painted dark brown, which was not the original color.

The original clear- coated, cypress- paneled walls remain intact on the south and east sides of this space. Paneling is done with 1 x 4 (nominal dimension) channel- groove, cypress boards, installed vertically with a ½" reverse-batten- type reveal between the 2 ¾ inch face of each board. These walls remain intact and in good condition.

Flooring: Low- pile, industrial- grade carpeting now covers the floor, a significant change from the reflective quality of the rubber tile which was originally specified. Manufactured by Robbins Floor Products in Tuscumbia, Ala-

Figure 30 Above, view to north of museum, 1962 (WRBR Visitor Center Collection)

Figure 31 Below, same view, today (National Park Service, 2000)

bama, "or approved equal," the tile was 9 x 9 x 1/8 in a pattern called "Patio- Tile." No substitution of pattern was permitted, according to the specifications, and "colors [were] selected from full- range available in this pattern." It is not known how much, if any, of this original floor covering might remain beneath the existing carpeting.

Photographs and documentary evidence suggest that the same pattern of rubber tile was used in the Lobby, the Museum, and the Flight Room and that it consisted of two different colors. The main floor area was covered with a blue- gray tile; the floor area in the bays formed by the projecting piers was covered with a gold tile (see notes on flooring in Flight Room for more details on color).

The original 4 inch metal base molding that was specified for the room (and which was originally painted orange to match the frames of the windows and doors) remains intact.

A mat, approximately 5 ½ feet square, was also installed in an aluminum- edged recess in the floor at the main entrance door. Specified as "reversible, ½" thick... rubber links strung on No. 10 galv. steel wires, brass end clamps all edges," the mat was eliminated or covered when the location of the main entrance was changed in 1975.

Ceiling: The existing suspended ceiling in the Lobby is a replacement of the original, which was a white version of the aluminum "honeycomb," suspended ceiling that still survives in the Museum. Above both of these ceilings, 12 x 12, acoustical, mineral- wool tiles ("Armstrong 'Cushiontone' or the like," according to the specifications) are attached directly to the concrete ceiling slab and painted a dark blue. The suspended ceiling was hung about 18 inches below the ceiling slab and set 10 feet above the floor. When the existing ceiling was installed has not been documented. The ceiling conceals some of the building's HVAC piping and equipment and, when it still had its honey- comb panels, was lit from above (see *Lighting*, below).

Windows and Doors: As already noted, the original exterior windows and doors, whose steel frames were painted orange on the interior and exterior, were replaced with the existing windows and doors in 1976. The 5' by 8'- 4" double- door opening between the northeast side of the Lobby and the offices is original and still contains the original steel- framed, solid-core wood doors with transom.

Lighting: Natural daylight was the primary lighting source for the Lobby, augmented by floodlights and can lights. Eight can lights, one or two of which remain intact, were installed above the metal- grid ceiling, providing diffused pools of light throughout the space. A pair of floodlights was also mounted through the northeast corner of the suspended ceiling. These fixtures no longer remain, but a small flush- mounted, "porthole" light is still in place high on the end of the exhibit wall at the north end of the Lobby. Presently the room is lit by a series of eight modern fluorescent- light fixtures that were installed along with the present suspended ceiling in the 1980s.

Other Features: A custom- designed information desk was an original feature of this room but has now disappeared. Located in the center bay on the east side of the room, it featured walnut butterfly joints connecting cypress panels over a metal frame. The top was black formica with a walnut edging.

A water fountain was originally installed at the north end of the bay next to the original information counter on the east wall of the Lobby. It has since been replaced with the existing modern fountain, which is handicapped accessible except for the lack of clearance between it and the east wall.

One of the original low radiators remains in place on the east wall. Its utilitarian metal housing was originally painted orange.

Gold drapery was installed on the east and west sides of the Lobby when the building was completed. Furnished and installed by Morton Marks & Sons, Inc., of Richmond, VA, the drapery hung from the bottom of the top ventilators to the floor. They were probably removed when the building was refenestrated in 1975. Documentation also exists in park files for sofas, chairs, plants, and other original furnishings and decorations in the Lobby, all now missing.

Museum (1680 s.f.): There is not a threshold separating the Lobby and the Museum, although the two spaces are visually separated by the exhibit wall that occupies the middle of the Museum's south end. The placement and the design of the exhibit wall direct visitor circulation from the Lobby into and around the Museum. This windowless area is one of the least altered spaces in the building. In addition to the original display fixtures, the Museum still retains its original wall and ceiling finishes, although plaster has been repainted and the rubber- tile floor covering (which matched that in the Lobby) has been carpeted.

Walls: The exposed concrete ceiling beams and piers of the structure create a series of bays in the space. The piers are plastered over wire lath and painted to match the plaster soffit in each bay. The wood- framed walls in each bay and across the north end of the room are finished with the same clear- coated channel-groove paneling used elsewhere in the building. Paneling remains completely intact and in excellent condition.

Flooring: Low- pile, industrial- grade carpeting now covers the concrete floor, a significant change from the light- colored reflective quality of the rubber tile which was originally specified. The same rubber tile specified for the Lobby and the Flight Room was also specified for this room but with a 4 inch rubber base rather than the metal base used in the other two spaces. Manufactured by Robbins Floor Products in Tuscumbia, Alabama, "or approved equal," the tile was 9 x 9 x $^{1}/_{8}$ in a pattern called "Patio- Tile." No substitution of pattern was permitted, according to the specifications, and "colors [were] selected from full- range available in this pattern."

As in the Lobby, the Museum, and the Flight Room, the main floor area was covered with a

Figure 32 Above, view to south in Flight Room towards Kill Devil Hill, 1962 (WRBR Visitor Center Collection)

Figure 33 Below, present view to northwest in Flight Room (National Park Service, 2000)

Figure 34 View of offices, 2000 (National Park Service, 2000)

blue- gray tile; the floor area in the bays formed by the projecting piers was covered with a gold tile.

Ceiling: The existing black suspended, metal-grid ceiling appears to be the original "aluminum honeycomb ceiling" that was specified for this room and for the Lobby. As in the Lobby, acoustical tiles were attached to the concrete ceiling slab above this ceiling and painted dark blue.

Lighting: The lighting specified for the Museum was similar to that specified for the Lobby, and two or three of the original but now inoperative can lights are still in place above the ceiling. Holes in the metal ceiling panels (which are original) correspond to the locations of the spotlights shown in historic photographs and on the original drawings. The existing series of spotlights appear to have been installed to improve lighting levels and not as part of a major redesign of the exhibit area.

Other Features: Most of the original exhibit design remains intact, although the museum was "rehabilitated" in 1984 and again in 1989. In spite of these changes, which included alterations to the lighting of the exhibit, most of the panels and artifacts that were installed in 1960 remain in place.

Flight Room: In most cases, visitors circulate through the Museum before entering the Flight Room, where they hear the ranger's interpretive overview of the site. The most significant changes to the space occurred in 1997 when the HVAC system was rehabilitated. At that time, the two full- height windows, which were originally located at each end of the north wall, were removed and the openings covered. At the same time, a new soffit was installed around the perimeter of the room to enclose ductwork for the new HVAC system, which significantly altered the appearance of this space.

Walls: Glass curtain walls form the south and west sides of the space, wood- framed curtain walls form most of the north and east walls. Except for the infilled areas at each end of the north wall, which are closed with drywall, the remainder of the north and east walls is paneled with channel- groove cypress as elsewhere in the building.

Flooring: Low- pile industrial- grade carpeting now covers the concrete floor, a significant change from the light- colored, reflective quality of the rubber tile which was originally specified. The same rubber tile specified for the Lobby and the Museum was also specified for this room but with a 4 inch, metal base rather than the rubber base used in the Museum. Manufactured by Robbins Floor Products in Tuscumbia, Alabama, "or approved equal," the tile was 9 x 9 x $^{1}/_{8}$ in a pattern called "Patio- Tile." No substitution of pattern was permitted, and "colors will be selected from full-range available in this pattern."

As in the in the Lobby and the Museum, the main floor area was covered with a blue or gray tile; the floor area in the bays formed by the projecting piers was covered with a gold tile.

Ceiling: The original specifications called for a "material- sprayed acoustic ceiling treatment" in the Assembly Room. The material contained "fiber- white virgin asbestos and small pellet white mineral fiber combined with inorganic binders," which was sprayed to a "latex- type emulsion adhesive" that had been applied to the underside of the concrete dome. Damaged by roof leaks, all of this material was apparently removed during an asbestos abatement project in 1987 and replaced by the existing sprayed- on acoustical ceiling treatment, which does not contain asbestos.

The low ceiling around the perimeter of the room was originally formed by exposed, corrugated concrete slabs. Rehabilitation of the building's HVAC system in 1989 included installation of a new drywall soffit that now covers about forty percent of the corrugated concrete. The extent of damage that installation of the soffit caused to the original concrete is not known but probably included drilling of holes as soffit attachments were made.

Lighting: The building's most distinctive lighting is found in the Flight Room. Besides the light from the clerestory windows, a series of twelve custom- designed, incandescent lights were installed on square metal arms that are strapped to the underside of the corrugated ceiling. In most cases, the fixture locations correspond with the location of channels for HVAC ducts in the corrugated ceiling. Fixtures were painted dark blue.

In addition to typical can- type lights in the soffits on the east and north sides of the room, two distinctive "porthole" lights are flush-mounted on the east wall. Mounted approximately 72 inches from the floor at each end of the wall, they are similar to the fixture mounted high at the end of the exhibit wall at the north end of the Lobby.

Other Features: The most- prominent features in the room are the reproductions of the Wrights' 1902 glider and their 1903 biplane. The original concept for exhibits included display of the 1903 plane but, in fact, the 1902 glider was first installed. Not until 1963 was a reproduction of the 1903 plane added to the room.

Offices: On the east side of the building are the offices, which have a separate exterior entrance from that side of the building and which occupy slightly less than one thousand square feet of floor space. Also entered through double doors from the northeast side of the Lobby, the Office area was originally divided into only two spaces: a large, open space that was designated for "clerks" and "historian" on the original plans and a smaller, private office for the superintendent at the north end next to the mechanical room. At an early date and using similar materials, both of these areas were subdivided further to create the existing configuration of spaces.

Walls: In addition to the exterior wall (described above), the offices are defined on the west by a wood- framed wall and on the north and south by painted, hollow- core concrete block. The wood- framed walls are finished with the same cypress used elsewhere in the building but with 3 ½- inch, V- joint paneling rather than the channel- groove paneling that was typically used elsewhere.

The offices were originally divided into two separate spaces by a "movable partition." The "panels" for the wall were to be pre- assembled cypress paneling attached to a light, 2 x 3 framework that rose only as high as the rooms' suspended ceiling system. Field connections were to be made with brass, oval, Phillips- head, counter- sunk screws "for easy disassembly." A relatively new concept in office construction, "movable walls" were meant to provide greater flexibility in the use of space, although it appears that the wall in the offices was never relocated after its initial installation.

Additional offices, which were not shown on the original plans, have also been created at the northeast side of the original main office area and at the east end of the superintendent's old office. The walls creating these spaces are also wood- framed and finished with V- joint, cypress- paneling, which is slightly narrower (3 ¼ inches wide) than the rest of the V- joint paneling in the offices.

A simple 2- inch bed molding is used as a crown molding on the wood- paneled walls but is absent on the CMU walls.

Flooring: The concrete floors in the offices are now covered with low- pile, industrial- grade carpeting, except in the office next to the mechanical room where the original tile survives. Asphalt tile (probably asbestos- containing), 9 x 9 x $^{1}/_{8}$, was originally specified for these spaces. Tile was to have been manufactured by Armstrong Cork Company and selected by the contracting officer from "color groups 'C'," which included a wide range of colors. It is unclear how much, if any, original tile might survive under the carpeting elsewhere in the offices.

Ceiling: The original specifications called for acoustical tile ceilings in the offices. The existing suspended ceiling uses 12 x 12 acoustical tiles and appears to conform to the original specifications.

Lighting: The present 4 foot by four foot fluorescent fixtures that light the spaces were called for in the original specifications and appear to be original.

Utility Spaces: A series of three small rooms occupies the space between the south end of the offices and the public restrooms. All three spaces are defined by CMU walls and poured-concrete floors and ceilings.

Staff Restroom: The original specifications called for a colored concrete floor, glazed ceramic tile walls, and an acoustical ceiling. These specifications were executed but the floor has now been covered with a sheet- vinyl floor covering.

Janitor's Closet: Original specifications called for a colored concrete floor, an exposed concrete ceiling and ceramic tile walls similar to those in the public rest rooms. All of these features remain intact, including the original red concrete floor, although it has now been painted.

Storage Closet: Original specifications called for asphalt tile flooring with a rubber- tile base, exposed and painted CMU walls, and an exposed and painted concrete ceiling. All of these features remain intact, probably including the resilient- tile flooring which matches that found in the original superintendent's office.

Public Restrooms: The two public restrooms are entered from the walkway on the east side of the building. There is no internal access, but that fact and their convenient location were typical of such park facilities in the 1960s. Both restrooms were altered when doors were replaced in 1975 and, again, when the skylights were replaced in 1982. Further alterations in the 1980s made the rooms handicapped accessible and introduced new floors and toilet partitions in both rooms.

Walls: The original ceramic tile remains intact and in excellent condition on the walls in both rooms. Tiles are hollow- core structural tiles with white- glazed faces $5\ ^{1}/_{3}$ x 12 laid in a stack- bond pattern.

Flooring: The original flooring was specified as colored concrete, probably red as is found in the janitor's closet. Probably in the 1980s, this floor was covered by the present epoxy- based composition flooring, which included a 4 inch base of the same material.

Ceiling: The original specifications called for a suspended acoustical ceiling set at 8'- 6" in both rest rooms. The present suspended ceiling appears to be a replacement of the original, perhaps installed when the skylights were replaced in 1982.

Lighting: Original lighting was incorporated into the original suspended ceiling and was re-

placed along with the ceiling, perhaps in the 1980s.

Other Features: Many, if not most, of the fixtures in both rooms are original, but the toilet partitions were replaced by high- density polyethylene polymer panels when handicapped accessible stalls were installed.

Mechanical Room: Located at the northeast corner of the building, the mechanical room is entered from the north end of the offices or from an exterior door on the east side. The original HVAC system was altered as early as 1962, reportedly because of scaling and corrosion from the hard well water. It was most recently rehabilitated in 1989 when much of the existing equipment was installed, including the boiler with its roof- top chimney stack at the northeast corner of the space. Little if any of the original equipment remains intact.

Walls: All walls are painted (white) CMU in good condition.

Flooring: The floor is poured concrete.

Ceiling: The poured- concrete roof slab, painted white, forms the ceiling for this room.

Lighting: The lighting is utilitarian.

Figure 35. Aerial view of Visitor Center, original and extended parking lot, and the historic flight field

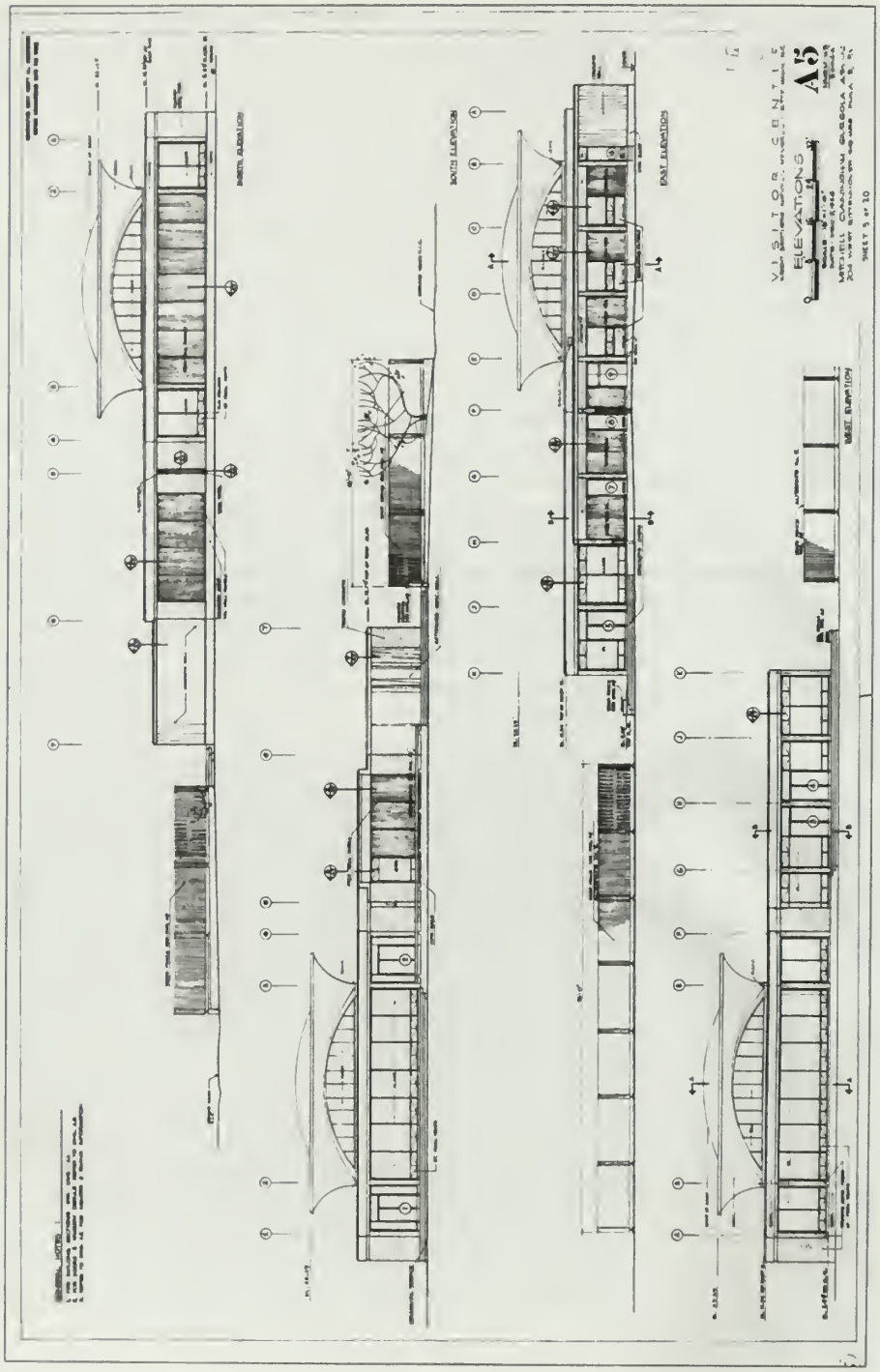

Figure 36. Visitor Center elevations from Mitchell/ Giurgola construction documents, December 1958 (National Park Service, Denver Technical Center)

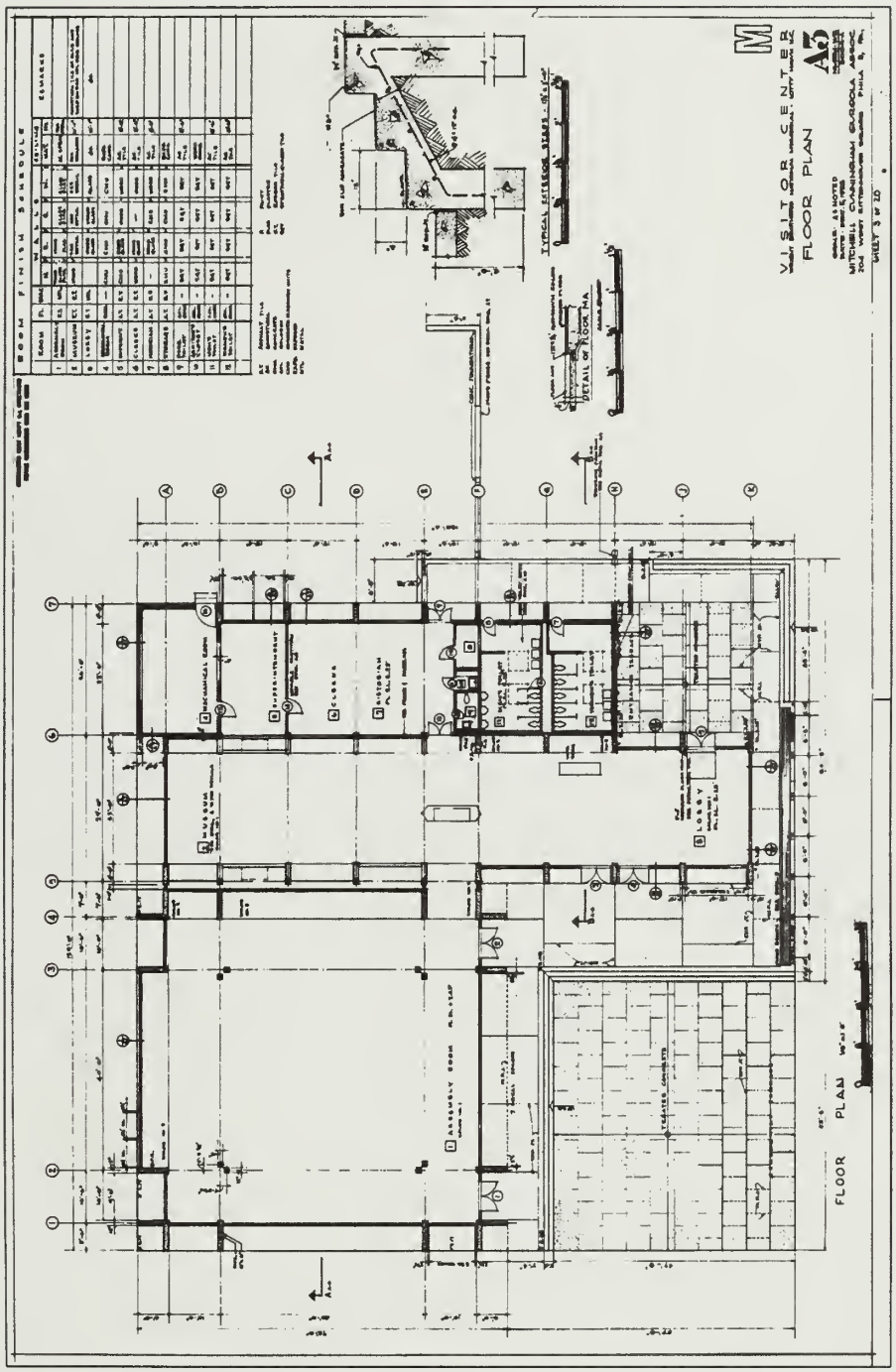

Figure 37. Visitor center floor plan from Mitchell/ Giurgola construction documents, December 1958 (National Park Service, Denver Technical Center)

Construction Timeline

WRBR Visitor Center

Original Construction

1957	October 23	Conrad Wirth promises to make construction of a scaled- down visitor center an immediate objective
1958	March	Mitchell/Giurgola produce first design sketches for visitor center
	June	New entrance road, parking lot alignment, and visitor center siting approved by NPS
1959	January 28	Plans and specifications sent out for bidding
	February 4	7 bids opened; contract awarded to Hunt Contracting Co. of Norfolk, VA
	February 13	Contract signed
	February 16	Notice to proceed with work given to contractor
	March 18	Contract- designated date for commencement
	March 24	Actual date of commencement of project
	August 6	First stop- work order issued, "stopped only superstructure concrete work when the contractor refused to follow instructions that he was not to pour concrete beams on rejected columns."
	August 11	Work resumes when contractor agrees to remove defective work
1959	September 11	Change Order #1 to add patterned wall at entry terrace
	September 24- 25	Mitchell/Giurgola make "field inspection"

WRBR Visitor Center

	October 20	Change Order #2 to adjust time
	December 3	Change Order #3, structural changes, sewage disposal system changes
	December 9	Plans for landscaping completed
1960	January 11	Contract- designated date for completion of project
	January 13	Change Order #4, plumbing change
	March 23	Change Order #5, walls and pumps
	March 31	Change Order #6, water supply changes
	May 9	Change Order #7, delete landscaping, fencing, bituminous walks; add weatherstripping, painting, plastering, drywall and electrical changes
	June 16	Second stop- work order issued after completion to allow time for final inspections
	June 17	Contract signed with Cotton Brothers for landscaping
	June 20	Construction of Visitor Center completed; final inspection and acceptance of work
	July 15	Visitor center officially opened to public
	July 19	Cotton Bros. begin landscaping project
	August 8	Plans for exhibit of 1902 glider completed
	September 12	Hurricane Donna damages fencing and landscaping
	October 28	Cotton Brothers contract completed
	December 17	Visitor center dedicated
1961	January 25	Final payment of $2500 made to contractor
	February 2	Completion report for visitor center construction filed; total project cost, $268,426.62

Modifications prior to 1980

1962		Small "concessions" being offered for sale in Lobby
	October	Bids opened for improvements to air- conditioning system

WRBR Visitor Center

1965		New master plan- "emphasize interpretation of the original event over memorialization of the Wrights' acheivement."
1966	October 15	Wright Bros. National Memorial listed on National Register
1968	October	Additional work on HVAC
1972		Roof covering repaired; marble chips replaced
1975		Floors carpeted except in superintendent's original office (annual report)
	May 30	Invitation to bid on refenestration of building
	June 20	Bid opening for refenestration project; East Coast Construction Co. awarded contract
1977	December 14	Plans completed for parking lot expansion
1978	June 26	Bidding for major auditorium addition, which was not built.
1979		Handicapped ramps installed (annual report)

Modifications since 1980

1980		Parking lot doubled in size
1982	August 11	Invitation to bid on replacement of roof covering
	October 12	Notice to proceed on replacement of roof covering; part or all of original built- up roof covering is removed; urethaneroof covering installed
1983	September 20	Complaints about new roof covering sent to contractor
1984		Wright Bros. hangar destroyed for third time by storm and rebuilt Handrails installed at Entry and Ceremonial Terraces
	July 19	Carpeting replaced (superintendent's office, closets, mechanical room excluded)
1985		Memorandum of Agreement with First Flight Society concerning an addition to the visitor center
1986		New public- address system installed in center
1987		Fee- collection station built and entrance gate replaced
1987	April	New roof covering experiences significant leaking

WRBR Visitor Center

	April 27	Asbestos abatement project completed in flight room
1988		New fire/security system installed; UV film applied to windows
	August 25	Repairs to roof covering
1989	June	Plans completed for rehab of HVAC system
1990s		Fence installed on east side of employee parking lot
1992		"Minor rehabilitation" of exhibits
1993		New fiberglass flagpole installed Wright Brothers replica "camp" buildings replaced
1996	September	NR lists visitor center as being non- contributing
1997		New GMP produced
1998		Cypress fence at main parking lot removed
1999	February 27	Wright Brothers Visitor Center listed as contributing building in the NR district (state level of significance meeting Criteria C for its architecture)
2001	January 3	Visitor center designated a National Historic Landmark

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Introduction

Interest in the preservation of modern architecture has emerged in recent decades as America's periodic construction booms have obliterated more and more landmarks from the post- World War II era. Small- scale buildings, like the Wright Brothers Visitor Center, have been especially vulnerable and even larger buildings, while not being demolished, have been drastically altered and re-designed to suit the tastes and needs of the Post- Modern era.

This loss has been fueled in part by those who continue to argue that there is inadequate historical perspective to assess the significance of buildings less than fifty years old and by many others who simply do not like modern architecture. However, the American Institute of Architects and an increasing number of preservation professionals, including many State Historic Preservation Offices, have taken into account the rapid pace of change that characterizes the country's turn- of- the- century built environment and have urged that steps be taken to preserve some of the best examples of mid- twentieth- century architecture before it is too late. As a result, the Wright Brothers Visitor Center was

re- evaluated in 1997 and, in February 1998, designated as a contributing structure in the National Register district that encompasses the Wright Brothers National Memorial. In addition, on 3 January 2001, the Visitor Center was designated a National Historic Landmark.

The National Park Service has been at the forefront of an effort to preserve structures from "the recent past." The visitor center at Wright Brothers National Memorial offers an outstanding opportunity to showcase a premier example of mid- twentieth- century Modernist design.

As a prototypical visitor center, the building was consciously designed to become an integral part of the site's interpretation. In the fifty years following the first flights, the site had changed dramatically, including a major shift in the location of Kill Devil Hill from which the early glider tests were made. Under these conditions, the siting and sequence of programmatic events became critical design considerations for introducing the visitor to the site. Mitchell and Giurgola's response included an arrangement of discrete visual barriers to shield views of the parking area and highway, in essence transforming the flight path mall into a "large room" which is entered through the visitor center. This interpretive philosophy, which established the visitor center as an "ante- chamber" or preparatory space before viewing an historic site, set a precedent in the conception of the National Park experience.

This section of the historic structure report is intended to show how a plan for treatment and use can be implemented with minimal adverse effect to the historic building while still addressing the problems that exist with the current structure and its use. The following sections outline issues surrounding use of the building as well as legal requirements and other mandates that circumscribe treatment of the building. These are followed by an evaluation of the various treatment options—preservation, rehabilitation, and restoration—before describing in more detail the proposed ultimate treatment: *general rehabilitation of the building with preservation and restoration of its most- significant features.*

Requirements for Use

One of the primary preservation issues with any historic structure is the use to which the structure is put. In almost all cases, continuation of the use for which a structure was designed and built is the preferred alternative, since changes in use generally necessitate significant changes to a building and a resulting loss of character- defining elements.

However, a variety of problems with the Visitor Center were noted in the park's 1997 General Management Plan (GMP), most of which are the result of overcrowding of the facility "during many days during the peak use season." Even "during normal summer visitation," the plan states, "the site's visitor center does not work efficiently." Both the Museum and the Flight Room are "overcrowded," the report noted, and "doors continuously open and close rendering the air- conditioning system inadequate."

The GMP also noted that "visitor flow and circulation throughout the facility is crowded and uncoordinated," which is partly the result of the sheer numbers of visitors who enter the site. Be-

sides overcrowding, however, visitor flow is disrupted by the presence of the Eastern National book store in the Lobby. Museum sales were not a component of the original plan for the Visitor Center, although unidentified "concessions" were being offered in the Lobby as early as 1962. Sales at the Eastern National outlet "have blossomed" now, according to the GMP, even though the space "is inadequate to display a full range of materials." As a result of the display of merchandise in the Lobby, the visitors' original sequential experience of the building has become disrupted and confused.

Finally, the GMP noted the Visitor Center's inadequate office space, which cannot even accommodate the superintendent's office. Storage and utility space, particularly as a stock room for the book store, are practically non-existent "In short," the GMP concludes, "the visitor center does not work."[1]

Clearly, if the park is to attain its management objectives, new or expanded facilities are necessary to deal with the increasing number of visitors to the site. The GMP was developed with the assumption that the existing Visitor Center would be demolished, in large part because of the fact that the visitor center was seen as a modern intrusion on the historic landscape. With the recent designation of the building as a National Historic Landmark, however, that is no longer an option. Section 110(a)(1) of the National Historic Preservation Act and NPS policy require that, "prior to acquiring, constructing, or leasing buildings for purposes of carrying out agency responsibilities," the Park Service *must use* historic buildings "to the maximum extent feasible." Even if a new visitor center were to be constructed, as was assumed in the 1997 GMP, the present facility cannot be simply abandoned.

A new center has been proposed for a site a few hundred yards southeast of the present Visitor Center. Romaldo Giurgola, in a 1997 letter urging preservation of his building, acknowledged that it "must be, by now, thoroughly insufficient." He suggested that "the building could certainly be put to good use as a ceremonial hall for special occasions, lectures and seminars, for conferences and exhibits, distinguishing its use from the mass operation and inevitable commercialism of an 'up- to- date' visitor center."

However, the construction of an additional building would raise difficult issues surrounding the integrity of the entire memorial site. Dividing visitor center functions between separate facilities would also create redundant services and significant logistical problems for the site. Finally, the cost of maintaining two separate buildings would probably present an unacceptable strain on the park's perennially underfunded budget for repairs and maintenance.

Attention has, therefore, returned to a major addition to the existing building. Most significantly, such an addition would allow for creation of a greatly expanded museum celebrating the origins of flight, a long- sought goal of the First Flight Society and its predecessors. By simply creating a larger pattern of circulation, an expanded museum alone could help alleviate much of the crowding that has plagued use of the existing building.

1. General Management Plan, p. 3.

New facilities could also incorporate modern office and utility spaces; and, if an addition were made to the north and northeast side of the present building, as was first proposed in 1978, removal of functions unrelated to visitor services (i.e., the mechanical room, offices, and employee parking) from the east side of the present building would free centrally located space for expanded visitor services. For example, adaptive use of the current office space could allow creation of a museum store with the space to display a full range of merchandise. The area already has convenient internal and external access and could easily be integrated into the new addition, giving the Wright Brothers museum store an excellent sales revenue that could be readily accessible to visitors from all parts of the center and from the outside.

Most important, the above changes in patterns of use would make it possible to restore and maintain the original function of the Visitor Center's primary spaces, which are the Lobby, the Museum, and the Flight Room. A significant aspect of the Visitor Center was the way in which visitor circulation was subtly directed by the building's design and, if that circulation could be maintained even while the facility is expanded, the impact of the building's architecture on the visitors' experience will remain undiminished.

Architectural and exhibit design are wonderfully integrated into a seamless whole in the museum and, although much of the exhibit content may be inadequate or dated, the existing historic character of the space should be preserved even while being adapted as a possible gateway into the new museum beyond. For example, the historic Museum could continue to function as it always has while providing an introduction to the larger, contemporary museum beyond. If the design of the new addition then included a connection back into the existing building through the north wall of the Flight room, that room, too, could continue as a spectacular venue for a final orientation of the visitors to the site, especially if the original fenestration of the building were restored.

Requirements for Treatment

Legal mandates and policy directives circumscribe treatment of the Wright Brothers Visitor Center. The NPS's Cultural Resources Management Guideline (DO- 28) requires planning for the protection of cultural resources "whether or not they relate to the specific authorizing legislation or interpretive programs of the parks in which they lie." Therefore, the Visitor Center must be understood in its own cultural context and managed in light of its own values so that it may be preserved unimpaired for the enjoyment of present and future generations.[1]

Section 106 of the National Historic Preservation Act (NHPA) also mandates that federal agencies, including the NPS, take into account the effects of their actions on properties listed or eligible for listing in the National Register and give the Advisory Council on Historic Preservation a reasonable opportunity to comment.

NHPA regulations (36 CFR 800.10) mandate special requirements for protecting National Historic Landmarks. Section

1. "Cultural Resource Management Guidelines," (1997), page 1.

110(f) of the Act requires that the Agency Official, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to any National Historic Landmark that may be directly and adversely affected by an undertaking. Examples of adverse effects include, but are not limited to:

- physical destruction of or damage to all or part of the property;
- alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access that are not consistent with the Secretary's Standards for the Treatment of Historic Properties and applicable guidelines;
- removal of the property from its historic location;
- change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
- neglect of a property which causes its deterioration; and
- transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long- term preservation of the property's historic significance.

Finally, to help guide compliance with the statutes and regulations noted above, the Secretary of the Interior's *Standards for the Treatment of Historic Properties* have been issued along with guidelines for applying those standards.

Ultimate Treatment & Use

The ultimate treatment of the visitor center is a rehabilitation project that includes four primary components:

1. preservation and repair of the building's existing architecturally significant features and material, especially on the exterior and in the Lobby, Museum, and Flight Room, which are the building's principal character- defining spaces;
2. rehabilitation of the building's mechanical and electrical systems to comply with modern building, life safety, and accessibility codes and to meet current and future programmatic needs;
3. design and construction of a new addition that would add a greatly expanded museum component to the site and accommodate new offices and other service areas; and
4. restoration of the building's significant features that have been lost to unsympathetic modern alterations.

These components also outline a natural hierarchy of treatment that should be used to establish priorities in achieving the ulti-

mate goal, should funding for the entire project be spread over several budgetary cycles. Few of the individual treatment recommendations below can be considered in isolation and, because they are interrelated, practical considerations of logistics and economy of scale will make it necessary to combine elements from the different treatment components in different ways to accomplish the ultimate result. In particular, design and construction of the proposed addition cannot be accomplished outside the context of the existing historic building.

PRESERVATION

The first component of ultimate treatment, preservation, would seek simply to repair existing material and maintain the existing character of the building, making those repairs and alterations that are necessary (1) to secure the building and its contents against further deterioration, (2) to eliminate threats to life safety, and (3) to make improvements to the building's fire detection system.

- Remove all existing roof covering, inspect condition of underlying concrete, make appropriate repairs, and install appropriate new roof covering
- Confirm function of roof drains; repair as necessary
- Improve flashing detail at sill of clerestory windows
- Replace all flashing with copper to match original
- Repair spalling areas of concrete (work may be extensive depending on conditions documented when existing roof covering is removed)
- Make repairs to protect exposed reinforcing steel in dome overhang
- Repair plaster soffits
- Replace and upgrade existing electrical, fire detection, and building security systems
- Clean all exterior concrete surfaces to remove harmful residues and improve building appearance and to allow for proper matching of materials as repairs are made to the concrete.

REHABILITATION

The second component, rehabilitation, would also seek to make improvements and/or alterations that would increase the building's utility to Park visitors, staff, and others that use the building. These could include improvements in accessibility for the disabled and replacement of building systems and/or equipment that may be antiquated but which are not hazardous to the building, its contents, or its occupants. All of these elements of the treatment program presume a new addition to the historic building and must be considered within that context.

- Redesign the building's HVAC system to allow relocation of existing equipment from mechanical room and from bays along north side of Flight Room (and also to allow removal of the modern soffit in the Flight Room)
- Rehabilitate existing office space and mechanical room to accommodate book store and stock room
- Rehabilitate Museum to accommodate access to new addition through north wall, designing the connection to allow maxi-

mum retention of the Museum's historic finishes; materials removed should be permanently preserved in the park's collection

- Where needed, rehabilitate Museum exhibit content while preserving historic exhibit walls and cases. Photographically record historic exhibit prior to rehabilitation; retain all original 3- D museum objects; and evaluate all other exhibition related materials removed against park WRBR museum Scope of Collection Statement.

RESTORATION

The final component of this program for treatment of the visitor center is restoration, which would seek to return the building to its historic appearance after its completion in 1960. Most significantly, this would include recreation of the building's original window and curtain-wall systems and a number of other changes to finishes and features on the exterior and in the three primary interior spaces. Some of these items are "stand- alone" projects; others should be incorporated into appropriate elements of the work outlined above.

Building Platform

- Replace ADA railings and ramps with more sympathetic design
- Reconstruct concrete planters for platform at Ceremonial Terrace
- Reconstruct original bench design on south side of building platform
- Replace modern concrete repairs to terraces and walks, formulating concrete to match color, aggregate, texture and other visual features of surrounding historic material
- Rehabilitate custom drinking fountain, recasting if necessary

Exterior

- Recreate original window/door curtain walls, using insulated glass but restoring design of original, including placement of door openings and repainting in original colors
- Remove spray- on roofing material from fascia
- Install rest- room skylights to match original, making improvements to design as necessary to insure maximum utility against leaks
- Restore original exterior lighting to recapture historic character, including can lights in soffits and roof- top floodlights illuminating the dome overhang. If additional lighting is required, fixtures should be sized and located so as not to diminish the historic character of the illumination of the structure.

Assembly Room

- If any rubber tile survives under existing carpet, reproduce to match. If the original tile cannot be located or if additional sound absorption is required for this specific area, install carpet tile to match size and colors (blue field with gold border) of original rubber tile.
- Remove recently installed AC soffit at ribbed ceiling.
- Restore original color scheme and finishes.
- Design new air- conditioning system that

does not intrude into the character of this space. Utilize integral ductwork in the ribbed ceiling wherever possible.

- Restore openings on north side of room, utilizing one for connection to the new addition if necessary
- Restore original lighting to recapture historic character, including fixtures (most of which exist); If additional lighting is required, fixtures should be sized and located so as not to diminish the historic character of the illuminated interior.
- Clean all exposed concrete surfaces; remove brown paint from smooth- troweled edges of concrete piers

Lobby

- Install metal- grid, suspended ceiling to match original.
- Restore original lighting to recapture historic character, replacing missing fixtures as necessary; If additional lighting is required, fixtures should be sized and located so as not to diminish the historic character of the illuminated interior.
- If any rubber tile survives under existing carpet, reproduce to match. If the original tile cannot be located or if additional sound absorption is required for this specific area, install carpet tile to match size and colors (blue field with gold border) of original rubber tile.
- Restore original color scheme and finishes
- Clean all exposed concrete surfaces; remove brown paint from smooth- troweled edges of concrete piers

Museum

- Restore original lighting to recapture historic character, replacing missing fixtures as necessary; If additional lighting is required, fixtures should be sized and located so as not to diminish the historic character of the illuminated interior.
- If any rubber tile survives under existing carpet, reproduce to match. If the original tile cannot be located or if additional sound absorption is required for this specific area, install carpet tile to match size and colors (blue field with gold border) of original rubber tile.
- Restore original color scheme and finishes.

Museum Addition

By their very nature, new additions to historic buildings have the potential (a) to damage and destroy significant historic materials and features and (b) to change the building's historic character. A new addition also has the potential to change how one perceives what is genuinely historic and thus to diminish its authenticity and those qualities that make the building eligible for listing in the National Register of Historic Places. Once these basic preservation issues have been addressed, all other aspects of designing and constructing a new addition to extend the useful life of the historic building rest with the creative skills of the architect. In essence, a project involving a new addition to a historic building is considered acceptable within the framework of the National Park Service's standards if it:

- preserves significant historic materials and features; and
- preserves the historic character; and
- protects the historical significance by

making a visual distinction between old and new.

When designing an addition to an historic structure, it is critical to consider potential loss of historic fabric. Loss can be minimized by limiting the size and number of openings between the old and new. A particularly successful method to reduce damage could be to link the new addition to the historic block by means of a hyphen or connector. In this way, only the connecting passageway penetrates a historic side wall; the new addition can be visually and functionally related while historic materials remain essentially intact and historic exteriors remain uncovered. Another design option is to place the addition in full contact with the historic building. This type of addition could abut the historic structure along the north elevation or could wrap around the historic structure at the northeast corner. This engaged addition can result in a higher degree of loss than that of a hyphen, both in the exterior walls as well as in significant interior spaces and features.

To meet National Park Service preservation standards, a new addition must be "compatible with the size, scale, color, material, and character" of the building to which it is attached (see Preservation Brief #14, New Exterior Additions to Historic Buildings: Preservation Concerns). A new addition will always change the size or actual bulk of the historic building; but an addition that bears no relationship to the proportions and massing of the historic building or that otherwise overpowers the historic form and changes the scale will usually compromise the historic character as well. The appropriate size for a new addition varies from building to building; it could never be stated in a tidy square or cubic footage ratio, but the historic building's existing proportions, site, and setting can help set some general parameters for enlargement. To some extent, there is a predictable relationship between the size of the historic resource and the degree of change a new addition will impose.

Constructing the new addition on a secondary side or rear elevation- - in addition to material preservation- - will also address preservation of the historic character. Primarily, such placement will help to preserve the building's historic form and relationship to its site and setting. Historic landscape features, including distinctive grade variations, need to be respected; and any new landscape features such as plants and trees kept at a scale and density that would not interfere with appreciation of the historic resource itself.

The final design criteria for new additions is that a modern addition should be readily distinguishable from the older work in order that there be no confusion between the historic building and modern additions. Although a visual distinction is necessary, the addition must still be harmonious with the old in terms of scale, proportion, materials, color, and character.

With these criteria in mind, the following observations are made regarding the relationship of a new addition to the historic visitor center. These are presented from the perspective of identifying features and approaches to the design of additional space that will maintain the historic visitor center and its integration with

the interpretation of the site as the focal point of the visitors' interpretative experience.

- Protect and emphasize the scale of the historic building and its site improvements and maintain them as the focal point of the arriving visitor's eye
- Place addition north and northeast of the historic building
- Limit the height of any new building to the flat roof part of the historic visitor center
- Interpret the natural elements of the environs in the materials of the building
- Interpret the natural forms of the environs in the building form while subordinating the addition to the historic visitor center
- Consider the diferentiation of building materials, through the variation of color, hue, and texture, to distinguish the addition from the Historic visitor center.

Mission 66 Visitor Centers, Chapter 2

by Sarah Allaback

WRIGHT BROTHER'S NATIONAL MEMORIAL VISITOR CENTER

KILL DEVIL HILLS, NORTH CAROLINA

Although Mission 66 development was considered crucial for public use of national parks, its modern architectural style did not always coincide with social expectations for wilderness parks, battlefields, or desert locations. Park Service and contract architects attempted to conform to the regional landscape, address local traditions, and temper the modernist aesthetic with appropriate materials. If the national parks and monuments posed countless environmental challenges, however, the site of the first successful powered flight offered an ideal context for a modernist building. The wind- swept dunes of Kill Devil Hills, North Carolina, suggested the clean lines of Mission 66 design, and, like the accomplishment it memorialized, the "new" architectural style represented innovation, achievement, and a future improved by technology. During the early 1950s, the Park Service designed an elaborate million- dollar aviation museum for the Wright Brothers National Memorial. Fortunately, funding could not be obtained for the proposed development, which would have overwhelmed the site with a sprawling modern complex. By 1957, the Park Service was ready to finance construction of a different type of facility. A new visitor center would centralize basic visitor services in a simple, compact plan. In accordance with Park Service practice, the modest visitor center would be built close to the "first flight" site, a location allowing visitors to view both the historic flight path and the memorial from the building's windows and exterior terrace. Small in scale and height, the building would not detract from the park landscape. The Wright Brothers Visitor Center was completed in the early years of Mission 66 and quickly became an example of what the development program could accomplish for a small park with limited resources.

The first organized preservation effort at the Wright Brothers site was launched in 1927 by the newly formed Kill Devil Hills Memorial Association. During its early planning stages, the Association imagined a future museum at the site, but a more immediate concern was the construction of an appropriate memorial atop its namesake sand dune. Congress authorized the Kill Devil Hill Monument National Memorial in March 1927, and the cornerstone for the structure was laid during the next year's anniversary celebration. Rodgers and Poor, a New York architectural firm, designed the 60- foot- high Art Deco granite shaft in 1931- 1932.[1] Crowned with a navigational beacon accompanied by its own power house, the tremendous pylon was ornamented by bas- relief wing design.[2] Kill Devil Hill was not the site of the Wright Brothers' achievement, but the launching point for earlier glider experiments and a location closer to the heavens than the Wrights' primitive airstrip on the flat land north of the dune. When the Wrights set up camp here from 1901- 1903, this land was constantly shifting sands. The Quartermaster Corps used sod and other plantings to stabilize the sand hill when the area was still under the jurisdiction of the War Department.[3] In addition, the Kill Devil Hills Association marked the location of the first flight with a commemorative plaque. During the 1930s, plans for the Memorial included a park laid out in the Beaux- Arts tradition, with a formal mall leading to a central garden flanked by symmetrical hangers and parking lots.[4] An airport served as the flat land terminus of the axis, and the Kill Devil Hill memorial as its culmination; six roads radiated out from the monument to the borders of the park. Although this scheme was never implemented, the system of trails and roads constructed by the Park Service in 1933- 1936 formed the basis for today's circulation pattern. A brick custodian's residence (1935) and maintenance area (1939) were built south of the hill.

When the monument was planned in the late 1920s, Congressman Lindsay Warren imagined a museum "gathering here the intimate associations" and "implements of conquest."[5] Almost

twenty years later, an "appropriate ultra- modern aviation museum" was proposed for Wright Brothers during the effort to obtain the original 1903 plane, but funding was not forthcoming.[6] Such an ambitious construction project began to seem possible in 1951, when the memorial association reorganized as the Kill Devil Hills Memorial Society, and prominent member David Stick established a "Wright Memorial Committee." Stick realized that a museum could only succeed with assistance from the National Park Service, local boosters, and corporate sponsors. Among the committee members recruited for the development campaign were Paul Garber, curator of the National Air Museum in Washington; Ronald Lee, assistant director of the Park Service; and J. Hampton Manning, of the Southeastern Airport Mangers Association in Augusta. In preparation for the first meeting, the Park Service drafted preliminary plans for a museum facility dated February 4, 1952.[7] Regional Director Elbert Cox introduced the project as a "group of buildings of modern form" to be located off the main highway northeast of the monument. The proposed-Wright Brothers Memorial Museum included a "court of honor," "Wright brothers exhibit area," "library and reception center," and funnel- shaped "first flight memorial hall" with outdoor terraces facing the view of the first flight marker to the north and Wright memorial marker to the west. The exhibit galleries were to contain "scale models of the various Wright gliders and airplanes, a topographic map of the area at the time of their experiments, scale models of their bicycle shop and wind tunnel, and photographic and other visual exhibits."[8] One wing of the complex housed offices for the museum curator and superintendent, workshop and storage rooms, and a service court. In elevation, the northwest facade is multiple flat- roofed buildings adjacent the double- height memorial hall, a slightly peak- roofed room with glass and metal walls.

Although it could not provide adequate funding for the museum, the Park Service entered into the planning process in earnest, producing revised plans and specifications in August 1952. Director Wirth looked "forward with enthusiasm to the full realization of the ... program," and promised that the Park Service would operate and maintain the facility once constructed.[9] He even included cost estimates for the buildings, structures, grounds, exhibits, furnishings, roads, and walks." During the summer, word of a potential commission spread and several regional architects notified Stick of their design services." Despite much effort, however, the committee was unable to raise funds for the million dollar complex, which was originally slated for completion by the fiftieth anniversary. Several smaller goals were achieved in time for the December 1953 celebration: the monument was renamed the Wright Brothers National Memorial, entrance and historical markers established, and reconstructions of the Wrights' living quarters, hanger, and wooden tracks constructed. Though disappointed at the lack of financial backing for the museum, the committee "strongly felt that the original plans for the construction of a Memorial Museum at the scene of the first flight should remain an objective of the Memorial Society."[12] The establishment of the Cape Hatteras National Seashore, also in 1953, may have contributed to their continued optimism.

Four years after the committee's initial attempt to fund an aviation museum, the National Park Service surprised all concerned with an offer to sponsor a scaled- down version of the facility. The committee met in Washington on October 23, 1957, only to learn that funds from the aircraft industry would not be forthcoming. During this meeting, Conrad Wirth outlined his Mission 66 program and revealed that a visitor center at Wright Brothers was included among the proposed construction projects. After further consideration, Wirth promised to make the Wright Brothers facility an immediate objective "by shifting places on the list with one of several battlefield visitor centers planned in advance of the forthcoming Civil War centennial"[13] just four years earlier, the Park Service had planned a modernist museum for the site on the scale of a Smithsonian, with the free- flowing design of a public building typical of the period. The visitor center of 1957 did not

have the aesthetic freedom of a such a museum. For its Mission 66 visitor center, the Park Service sought a smaller, less expensive, more compact structure with distinct components: restrooms (preferably entered from the outside), a lobby, exhibit space, offices, and a room for airplane displays and ranger programs (in place of the standard audio- visual room or auditorium). As designers of the new building, the Park Service chose a new architectural firm based in Philadelphia: Mitchell, Cunningham, Giurgola, Associates, which was soon known as Mitchell/Giurgola, Architects.[14] With its symbolism of innovation, experimentation and evolving genius, the building was an ideal commission for the fledgling firm.

MITCHELL/GIURGOLA, ARCHITECTS

The Wright Brothers Memorial Visitor Center was the "first building to achieve nationwide recognition" designed by Ehrman Mitchell and Romaldo Giurgola.[15] Although only a year old in 1957, the visitor center building type was not unfamiliar to either young architect. Mitchell and Giurgola met in the office of Gilboy, Bellante and Clauss, a Philadelphia firm commissioned to design the 1955- 1956 visitor centers at Jamestown and Yorktown.[16] During Gilboy, Bellante and Clauss' association with the Park Service, Mitchell and Giurgola became acquainted with John B. Cabot, chief architect of the Eastern Office of Design and Construction. In October 1957, Mitchell invited "Bill" Cabot to a cocktail party at the family's new home in Lafayette Hill, Pennsylvania. The two discussed the prospect of Park Service work for the untested firm of Mitchell/Giurgola. As Mitchell recalls, Cabot said, "Mitch, don't call me, push me, pressure me ... if I get work, I'll call you.[17] A few months later, Cabot did call. When Mitchell questioned the Chief Architect about his choice of virtually unknown architects for the prestigious commission, Cabot said that the recent recession in the Eisenhower administration affected his decision: "We got a directive to get every project on the street. We had eight projects and seven architects."[18] If Mitchell/Giurgola obtained the Wright Brothers' Visitor Center contract by being in the right place at the right time, the results they achieved far surpassed the Park Service's expectations. The publicity the building would receive in popular architectural journals over the next decade resulted not from the architects' reputation as accomplished modernist architects, but from the design of their building.

Born in Italy in 1920, Romaldo Giurgola was educated at the University of Rome and, beginning in 1950, at Columbia University. He taught at Cornell and served as an editor of Interiors magazine before joining the faculty of the University of Pennsylvania in 1958. Ehrman B. Mitchell, Jr., a Pennsylvania native born in 1924, received his architectural education at Penn and a position with a local firm soon after graduation. Three years later he joined Gilboy, Bellante and Clauss of Philadelphia and in 1951 became the supervisor of the firm's London office. His work in England included coordinating with a large English consulting firm in the design of military air fields. When Mitchell returned to Philadelphia by the mid 1950s, he was experienced in running international architectural firms. In 1957, he and Giurgola began planning their partnership, and with the prospect of work from the Park Service, opened their own Philadelphia office. Along with the visitor center commission, the firm designed two other public buildings, several residences, and projects for competitions during its first few years in business.[19] When Giurgola became chairman of Columbia's architectural department in 1966, the firm opened a second office in New York. By this time Mitchell/Giurgola was a well known architectural presence with an award- winning parking garage and the much sought after commission for the A.I.A. headquarters building in Washington, D.C., to its credit.[20] Ten years later, the partners would receive the A.I.A. firm

award, the organization's most distinguished award for an office. The bicentennial year also marked the dedication of Mitchell/Giurgola's second Park Service structure, the Liberty Bell Pavilion on the mail across from Independence Hall.[21] Among the firm's many significant achievements are the headquarters building of the United Fund in Philadelphia (1971), of which one architectural historian declared "one has but to travel up and down the east coast of the United States to see the influence it has had on urban architecture."[22] Mitchell served as president of the A.I.A. in 1979- 1980; and, in 1982, Giurgola was awarded the A.I.A. Gold Medal, the highest honor bestowed upon individual architects. The Wright Brothers Visitor Center was not only featured in the A.I.A. nomination, but as part of a traveling "Gold Medal Exhibition" sent to schools across the nation.[23] Architectural historians assessing the firm's career look to this building as the beginning, and, as their first significant work, a benchmark from which to judge future growth and change.[24]

The Wright Brothers Visitor Center commission not only inspired Mitchell and Giurgola, but, more importantly, proved a challenging design problem worthy of national recognition. Like a handful of other park sites, the Wright Brothers Memorial is a monument to scientific and technological achievement. For the architects, as for the public, its value lay both in its significance to the history of aviation and to the more personal story of perseverance and experimentation leading to scientific progress. During the 1950s, when many of the country's first modern airports were under construction and the dream of space travel became a reality, aviation facilities used modern technology and materials to create aesthetic representations of flight, suggesting the limitless future of transportation. One early example, the terminal building at Lambert St. Louis Airport designed by Minoru Yamasaki with George Hellmuth and Joseph Leinweber (1953- 1956), housed terminals in three concrete groin- vaulted buildings with glass and aluminum forming the semicircular walls of the remaining space. By the beginning of the Mission 66 program, Eero Saarinen, creator of the Jefferson National Expansion Memorial, was busy with plans for the TWA Terminal at Kennedy International Airport, New York (1956- 1962), and Dulles International Airport, Reston, Virginia (1958- 1962). In November 1957, park employees sent bags of sand from Kill Devil Hills to Los Angeles for the dedication of the city's "Jet- Age Expanded International Airport.[25]

Along with social change, the early 1960s brought restlessness among elite designers and a readiness for new leaders in the profession. In 196 1, architectural critic Jan Rowan used the term Philadelphia School to describe what he hoped would become an exciting new direction in the practice of architecture. Architectural historians of today are equally eager to group Mitchell/ Giurgola in this innovative "school" and to compare their work with the designs of Saarinen and others. As Ehrman Mitchell recalls, he and his partner were not thinking about modernist philosophy during their work at Wright Brothers, nor were they particularly interested in striking out in a new direction. The architects approached the Wright Brothers commission as a "natural response to conditions of program" and were motivated by "the quest for modern design." The overwhelming challenge was to portray the idea of flight in a static form. Mitchell/Giurgola's unconsciousness of any deliberate attempt to remake modernism was an early indication of their originality and key to their successful practice.

In theoretical discussions following construction of the visitor center, Mitchell and Giurgola explained how the firm was both modernist and critical of the standard tenants of previous modern design. As important as their built work, the theory and projects of Mitchell/Giurgola not only influenced generations of student architects, but inspired the flagging profession with new hope. Mitchell and Giurgola considered themselves ... inclusivist"' in their architectural theory and were

convinced that a "'partial vision"' in design presented a more acceptable view of reality than the elitist and exclusionary practices of past modern architecture.[26] The young architects began their career at a time when severe modernist architecture seemed to lack the vim and vigor of real life. The work of Philadelphia architect Louis 1. Kahn offered exactly what was missing: a sense of order and a reason for being. Kahn passed on his architectural theories in lectures at the University of Pennsylvania and in his buildings; construction began on the University's Richards Laboratories in 1958, the year Giurgola joined the faculty. Energized by Kahn's work and their shared experience at Penn- Mitchell, Giurgola, Robert Venturi, Robert Geddes, and other young architects emerged as a new force in the profession. By the mid- 1960s this "Philadelphia School" was considered on the cutting edge of architectural design. As Rowan described it, the Philadelphia School responded to the modernist work of such icons as Richard Neutra and Mies van der Rohe. In place of the abstract forms and universal principles of the previous generation, the younger architects gravitated toward Kahn's more personal and sensitive design philosophy. The close relationship between Mitchell/ Giurgola and Kahn is illustrated by the writings of Romaldo Giurgola, who not only became an ardent follower, but a scholar of Kahn's work. Closer study of Giurgola's writings helps to show how Kahn influenced the firm's attitudes toward place, community, and landscape and their expression through the use of light and attention to building materials.[27]

Although their first major building, Mitchell/Giurgola considered the Wright Brothers Visitor Center an important example of their architectural philosophy; the design is clearly a response to the methods of their predecessors and to the new possibilities outlined by Kahn. In a 1961 reference to the design methodology employed at Wright Brothers, Giurgola explained that the "order will be the participation in the environment of the building's special theme, not the imposition of abstract forms."[28] The same year, when interviewed for Progressive Architecture, Giurgola spoke about the role "subjective experience" played in the design process, a subject considered taboo to the blatantly objective proponents of the International Style.[29] The article included a full- page detail photograph of a segment of the visitor center illustrating the contrast of wood panels and concrete, close- ups of the entrance and ceremonial terraces, and smaller views of the overall building and plan. With the exception of Quarry Visitor Center at Dinosaur, completed in 1958, the Wright Brothers Visitor Center received the most media coverage of any National Park Service project of its type.

The Philadelphia office of MitchelI/Giurgola, Architects became MGA Partners in 1990. The principals of this successor firm- - Alan Greenberger, Daniel Kelley, and Robert Shuman- - worked with the founders beginning in the 1970s. MGA Partner's current projects include the Gateway Visitor Center on Independence Mail, a new facility slated for completion in 1999, the Children's Discovery Museum of the Desert in Rancho Mirage, California, and a theater and drama center for Indiana University in Bloomington. The firm also inherited records and drawings from past projects, most of which have been transferred to the Architectural Archives at the University of Pennsylvania. The NewYork office retains the original name "Mitchell/Giurgola." In 2000, Ehrman Mitchell is retired and living in Philadelphia. Romaldo Giurgola lives in Australia, where he is a partner of Mitchell/Giurgola &Thorp Architects of Canberra and Sydney.

DESIGNING THE VISITOR CENTER

During his speech at the 1957 First Flight Anniversary ceremony, Conrad Wirth described "major developments" scheduled for Wright Brothers Memorial over the next two years. The Park Service planned to proceed immediately with construction of a new entrance road and parking lot for the visitor center. Actual construction of the visitor center would begin during the next fiscal year. The new building would "accommodate visitors in large numbers ... provide for their physical comforts ... and present the story of the Wright Brothers at Kill Devil Hill in the most effective way graphic arts and modern museum practice can do it."[30] Wirth's remarks seem innocent enough, but the new building transformed the visitor experience at Wright Brothers. As historian Andrew Hewes pointed out in 1967, the focus of site interpretation shifted from the memorial shaft to the visitor center. The interior of the shaft and a stairway to the top of the monument had been open to visitors since its creation, but in 1960 access was closed. During an August 1958 committee meeting, members agreed that "special consideration be given to directing people to the first flight area rather than to the memorial feature."[31]

Excitement over what shape the visitor center might take increased after the groundbreaking at the anniversary ceremony. According to Superintendent Dough's monthly report, "Mr. Benson of EODC and Messrs. Mitchell, Cunningham and Giurgola" visited the site on March 15 "in order to work up final drawing plans for the visitor center." These were actually preliminary design studies, the first of over one hundred, sketches and drawings created for the visitor center. The next month, "Messrs.Tom Moran, Harvey H. Cornell (landscape architect), Donald F Benson and others" gathered to discuss the location of the visitor center and parking area. The Superintendent included an uncharacteristically lengthy comment on the results of these meetings:

The final plan reflects contributions from the Washington, Region One, EODC and Memorial offices as well as contributions of members of the architectural firm preparing the plans. It always impresses us to witness the Service planning a development as a team; wherein, after an exchange of ideas, the end product is better than any one individual or office could plan.[32]

This collaborative effort took shape in the Park Service's development drawings of Route 158 (still under construction), the entrance road to the monument, the parking lot, visitor center footprint, and paths to the quarters and hanger.[33] The location of these features and the connections between them were approved by John Cabot, Regional Director Elbert Cox, Thomas Vint, and Conrad Wirth between April and June 1958. As the Mission 66 report for the park emphasized, the visitor center was to be "within the Memorial near the camp buildings" and a trail would lead from the facility to the first flight area.[34] Mitchell corroborated that the siting of the building was entirely a Park Service decision. The site was "exactly what they dictated. The location was specified as being close to the flight line." In a recent letter, Giurgola agreed that the site "was carefully planned while working closely with the NPS."[35] The Park Service wanted the public to stand under the dome and be able to see the monument and first flight markers from inside the building.[36]

Mitchell/Giurgola's early sketches on yellow trace, produced in March and April 1958, included several very different ideas for the overall plan of the building and its exhibition space. In one case, the architects envisioned an office wing separated from the rest of the building by a landscaped courtyard; the gallery was two stories. They also considered placing the central lobby and information area between an office wing and exhibit gallery. A version of the compact organization that would become their final choice was considered in March but not accepted until later in the design

process. The architects' proposals for the double- height gallery and fenestration demonstrated their interest in creating dramatic effects of light and shadow, not to mention maximizing the opportunity to frame specific exterior views. Fenestration possibilities ranged from triangular mullion designs to vertical and horizontal patterns on the upper half of the exhibit space. These window arrangements were coordinated with first- floor windows, usually of a contrasting design. One perspective shows this gallery as a glass- walled cylinder; another slices a parachute- shaped roof open in the center and inserts a half- moon of glass. In some of the sketches the architects used brilliant colors- bright white, yellow and turquoise- to emphasize the contrast between translucent and solid sections of the window walls. Subtle changes in the patterning of window facades and ceilings altered the effect of mass, causing the gallery to "float." Throughout their artistic experiments, Mitchell and Giurgola were considering the location of the building in relation to the hilltop monument and the flight area. Preliminary site sketches include arrows indicating vistas from the building to these points of interest. The firm's early design efforts demonstrate a wide range of possibilities, but none that compare with the final plan in terms of clarity of program, circulation, and function.[37]

While the architects worked with possible design schemes, the park turned its attention to construction of the parking facilities accompanying the new building. In June the contract for the new entrance road and parking area was awarded to Dickerson, Inc., of Monroe, North Carolina, for the low bid of $73,930. The 0.56 mile road and parking area was to be completed within two hundred and fifty days.

A group of EODC architects and landscape architects- Zim mer, Moran, Roberts, and McGinnis- visited in August "to discuss plans for the Visitor Center and Parking Area.[38] As Dough remarked, "the completion of the road project will pave the way for the building contractor."[39] The planning for the visitor center project also provided the incentive to finalize a land acquisition deal for which state funds had already been allotted. Congress authorized the Memorial's boundary expansion in June 1959, adding an additional one hundred and eleven acres to the park .[40] This extension provided the additional land to the east and north of the building necessary to include the fourth landing marker and parking lot.

The preliminary plans submitted by Mitchell/Giurgola at the end of the summer were visually pleasing as well as instantly readable. The initial sketch in the series only depicts the building's ceremonial terrace, the roof overhang, and the edge of the lobby framing a panoramic view of the monument, barracks, and take off and flight markers. The final plan organized the elements of the program within a square, avoiding the potential monotony of such geometry by alternating interior space with open exterior terraces. The architects' early sketches suggest that their artistic exuberance might have been a little shocking to their Park Service clients. Perhaps in an effort to temper the more unusual aspects of the design, Mitchell/Giurgola produced several more subtle sketches. In elevation, the shell roof appears to diminish; from some angles it appears to dominate the structure, but as the building is approached, the dome gradually levels out and almost disappears. Among the preliminaries is a view of the building and the distant Wright Brothers monument against the night sky. Two- thirds of the paper is black and the building barely distinguishable among the trees and gentle rise of the horizon. Attention is focused on the road leading into the park, an exiting car, and a car passing by on the main highway.[41]

The Park Service invited Stick and his committee to a meeting for review of the preliminary plans of the building and exhibits on July 28, 1958. In August members of the committee awaited copies of the revised building plans. A misunderstanding prevented Mitchell/Giurgola from beginning the working drawings, and when Cabot asked about their progress in late September, they were stunned. Despite this slow start, the architects rushed to complete the required drawings by the December 7 deadline. The working drawings essentially refined the designs presented earlier, but the cover sheet depicts an unusual perspective of the floor plan. The axonometric aerial view emphasizes the extent of window space, shown as thin, solid lines, in contrast to the three- dimensional walls. A plan and elevation appeared in a February 1959 "news report" in the popular journal Progressive Architecture. The short description, "Two Visitors' Centers Exemplify New Park Architecture" noted that "the design of visitors' facilities provided for national tourist attractions seems to be decidedly on the upgrade, at least as far as the work for the National Park Service is concerned." Perhaps not coincidentally, the other visitor center pictured was the work of Bellante & Clauss at Mammoth Cave National Park.[42] Later that year, the architects submitted a presentation drawing, complete with a small boy flying a toy plane in front of the ceremonial terrace, and a twelve- inch sectional model of half of the exhibit hall (see figure 20 on page 77). The model effectively demonstrated the building's innovative air circulation system with a cut- away view of the duct in the assembly room. In section, the concrete dome appeared lighter and more "wing-like" than depicted by drawings.

As December 7 approached, the committee began planning for its annual celebration, combined this year with the observance of the 50th anniversary of the United States Air Force. The committee hoped that a ground breaking or cornerstone laying ceremony might be included in the festivities. A month earlier, Lee reported that the final drawing for the visitor center was not complete and, therefore, the accurate laying of a cornerstone impossible.[43] The Park Service chose to initiate the Mission 66 program at Wright Brothers with a speech by Conrad Wirth outlining improvements scheduled for the Memorial over the next two years. Wirth had the honor of digging the first shovel of earth at the site of the future visitor center with a silver spade.[44]

In a one- sheet resume promoting Mitchell/Giurgola, written a few years after the visitor center dedication, the architects described the Wright Brothers commission as "among our major projects" and went on to discuss its design in some detail. The "dome- like structure over the assembly area:' though technically "a transitional thin shell concrete roof with opposed thin shell overhangs connecting the perimeter of the structure to form a complete monolithic unit:' also had a symbolic role. The roof structure design "admirably serves to allow light into the display area of the aircraft to give this area a significant character as well as forming a strong focal point on the exterior of the structure which stands above the low- lying landscape, in concert with the higher rising dunes and pylon." Evidently, the north concrete wall of the entrance terrace had been the subject of considerable public speculation. Here, and in their resume, the architects explained that the patterned wall was intended "to be an expression of the plastic quality of concrete by means of well- defined profiles, recessions and protrusions, simply placed to form an integral pattern over the wall surface." Not only did the wall feature rigid and curved shapes, but also contrast in depth and surface, as sections of the wall were bush hammered. In effect, the concrete patterned wall was public art.[45]

The attention lavished on aesthetics and symbolic purpose, as described by Mitchell/Giurgola, did not detract from the visitor center's practical function. Visitors appreciated the straightforward approach to the building from the parking lot and the exterior restrooms adjacent the entrance terrace. They may not have noticed the unusual shape of the drinking fountains, with their molded

concrete basins, or paid much attention to the undulations and protrusions of the sculpted wall. But even at the most basic level, these design elements suggested the free- flowing form of both sand dunes and objects that fly. The entrance terrace was also part of the 128- foot- square concrete platform elevating the entire building a few feet above the ground. Steps extended to either edge of the terrace, and visitors crossed the open area to reach the double glass doors leading into the lobby. At this point, visitors were also invited to walk around the building to the ceremonial terrace. The entrance facade was full- height steel- framed windows divided by concrete piers, a pattern of bays encircling the building. Similar windows formed the far wall of the lobby, which could be seen by looking through the building from the terrace.

Upon entering the visitor center, attention was immediately directed towards the ceremonial terrace outside and the first flight monuments beyond. The Park Service information desk was actually located behind the visitor at this point. Since the lobby space flowed into the exhibit room, visitors gravitated to this area after taking in the view. The walls of the exhibit area were entirely covered with vertical tongue- and- groove cypress boards and wood paneling. This interior treatment, combined with the lack of windows, resulted in an inward- looking museum space conducive to study.46 Park offices were located to the left of the exhibit area. Once visitors had followed the exhibits in a rectangular pattern around the museum, they found themselves at the entrance to the assembly room. In contrast to the muted tones and contemplative mood of the museum, the assembly room was a double- height space full of light from the three clerestory windows in its shell roof and the floor- to- ceiling windows on three sides. The shell roof, the 40- foot- square shape of the space, and the square mirrored above in the corrugated concrete overhang also emphasize the importance of the replica 1903 flyer in the center of the room. This assembly area was intended to substitute for an audio- visual or auditorium space, and in their presentations, Park Service interpreters would not only use the plane as a prop, but point out the flight markers, hangar and living quarters, and distant hilltop monument. Double doors at either end of the south facade led out to the ceremonial terrace. When groups gathered here for the annual celebration and other events, the Memorial's significant features stood in the background.

Although the interior contrasts in ceiling height and the amount of light emitted into the spaces belies the fact, the visitor center's walls are divided into equally spaced bays; whereas the assembly room is all glass, however, the office and exhibit spaces alternate cypress wood panels with sections of treated concrete. The faces of the piers are bush hammered. These surface contrasts force the visitor to pay attention to the composition of materials: the durable cypress wood, traditionally used in boat building, and the color and texture of the aggregate, which includes sparkling chunks of quartz and other arresting stones. In theory and practice, the Wright Brothers Visitor Center was a balance between aesthetics and function.

The best example of Mitchell/Giurgola's concern with aesthetically pleasing structure is also the least noticeable. The mechanical systems for heating and cooling the building were "inconspicuously incorporated" into the building. Progressive Architecture was particularly interested in the "water- to- water heat pump" that both took advantage of the oceanfront location and eliminated the need to compromise the building's "vast horizontality with a vertical stack."[47] Fan- coil units and ducts were hidden above a suspended ceiling in the lobby and museum, but in the assembly room, they became part of the interior decoration. The corrugated concrete overhang houses ducts that pull in fresh air from outside, and the "soffit" below is a "continuous slot" for return air. Frederick W. Schwarz of Morton, Pennsylvania, was the consulting engineer for the heating and air conditioning system.

BUILDING THE VISITOR CENTER

Donald Benson remembers the prospect of a modernist visitor center on the Outer Banks of North Carolina as more controversial than the colorful beach shelter he designed for Cape Hatteras National Seashore a few years earlier. The shelter's sun shades rose out of the beach like sculptures, but such artistic license was acceptable in a recreational facility devoted to seaside entertainment. In contrast, the visitor center was expected to be functional, dignified, and a public building for the local community. If the Park Service was now familiar with the Mitchell/Giurgola design, local contractors must have been surprised when sets of plans and specifications were sent out for bidding in January 1959.[48] Modern architecture was not part of the design vocabulary of the region, nor were modernist buildings prevalent in the state of North Carolina.[49] Bids were opened on February 4, 1959, and the contract was awarded to Hunt Contracting Company of Norfolk, Virginia, for their offer of $257,203.[50]

Construction of the visitor center began in March 1959, and foundation piles had been driven by the end of the month. In early spring, the beam forms were at grade level. Superintendent Dough predicted rapid progress now that "the slow process of getting the building staked out, supplies on hand and work organized has been completed."[51] Concrete columns and piers were erected in June and most of the floor slabs poured. On July 24, the contractors' work was inspected by Tom Vint, chief of design and construction, and Chief Safety Officer Baker, both of the Washington office.[52] By the end of the summer, the east elevation had begun to take shape. A view from the south shows the beams for the exhibit room standing apart from the office wing. The next month, contractors were laying the ribbed ceiling forms for the corrugated concrete overhang around the perimeter of the assembly room.[53] The major concrete portions had been cast, and Mitchell and Giurgola may have witnessed some of this form work during their "field inspection" at the site on September 24- 25.[54] Form work for the patterned wall was well underway by October. A steel grid was used to create the protruding shapes on the surface of the wall. While the decorative wall was under construction, contractors were also assembling the arch beam forms of the dome. The general shape became visible in November; a plywood shell framed the central half sphere, and intricate interior scaffolding supported the dome framework throughout this construction. Engineer Don Nutt of EODC witnessed the "dome pour" later in the month. Smooth reinforced concrete covered the central portion first. The contractors then turned to form work for the "flange overhangs," which were subsequently poured. The dome sat on four coupled columns and was "tied" at its base by four tension rods. A December photograph of the assembly room interior shows the completed dome and semi- circular windows, the supportive scaffolding removed.

Despite colder temperatures, contractors were able to pour the steps of the visitor center in January 1960. Chief of EODC Zimmer and Supervising Architect Cabot spent two days "reviewing progress and details" of the construction that month, and Don Benson and Ann Massey, both of EODC, visited the site to discuss color and design.[55] Interior framing was still exposed in February, but the dome, overhang, and exhibition area roof were considered complete. Roofing compound was applied to the lobby section of the visitor center the next month, although glass sections of the building remained empty. Wall panels and windows were not installed until April, when engineer Don Nutt and landscape architect Ed Peetz (EODC) visited for a construction review. Sometime during the month, the contractor made his third estimate for a completion date, settling on June 10. The final inspection of the visitor center took place on June 20, 1960. Evidently no major changes were required, and specialists from the museum division were busy installing the twenty- one museum exhibits during the first weeks of July, when work also began on the surrounding landscaping.[56]

The contractors for "planting and miscellaneous construction"- - - Cotton Brothers, Inc., of Churchland, Virginia- - - had replaced existing concrete walks and additional pathways by mid- August. Landscape work involved grading and spreading topsoil as well as "considerable experimentation and effort with native groundcovers. "After completing the walks, seeding, planting tubs and flagpole base, the contractors began work on the wooden fence. Progress was interrupted by Hurricane Donna, which struck September 11 and leveled sections of the fence, but repairs were accomplished by the end of the month. In addition, the contractors planted twelve varieties of trees and provided plants for inside the museum. Before the final inspection, Cotton Brothers installed the Park Service's signs and gate.[57]

The Wright Brothers Memorial Visitor Center was officially opened to the public on July 15, 1960. By all accounts, the building met with a positive reception. Superintendent Dough wrote that "hundreds of compliments have been received about the exhibits and the building's design since it was opened. Visitors are generally surprised to learn of the aeronautical principles formulated by the Wrights, and the descriptive term 'beautiful' is used repeatedly in describing the building." He also noted that although about two thousand visitors passed through the visitor center every day during the summer season, "these are so well distributed during visiting hours that there are seldom over 75 visitors within the building at a time.. .."[58] During the month of August, the site received 62,177 visitors, a 34 percent increase since the year before, and approximately three thousand more visitors than visited in August 1998.[59] Although Dough seemed optimistic about these figures in his initial report, by September he had become concerned about the "too interesting" museum exhibits, which he blamed for causing congestion in the visitor center. On five peak days "... 3,500 plus jammed into the visitor center." Dough indicated that the Park Service had not expected such crowds until 1966, as shown by graphs included in their Mission 66 prospectus. Rather than consider a building expansion, however, Dough suggested changing the exhibition layout: "More museum exhibits to further spread out the visitors may be the answer, but in our view the law of diminishing returns sets in when many more than about 19 exhibits are installed in a visitor center."[60] Mission 66 planning documents indicate that the Park Service anticipated record numbers of visitors- - - nearly ninety thousand per month by 1966- - - and judged the visitor center facility adequate to serve their needs.[61] By that time, Dough had retired and Superintendent James B. Myers assumed his post.

DEDICATION OF THE VISITOR CENTER

The exterior appearance of the visitor center was significantly altered by the end of the summer, with the completion of the wooden fence shielding the parking area from a clear view of the first flight markers and buildings. In preparation for the dedication, landscape architect Lewis from EODC "inspected new planting and miscellaneous construction:' and the Park Service's supervisory architect, Judson Ball, reviewed the state of the visitor center.[62] By September the walks from the visitor center to the camp buildings and the main entrance gate were complete. The information desk for the lobby was delivered and installed, and planning for a permanent display of a Wright glider replica continued.[63]

The Wright Brothers Memorial Visitor Center was dedicated on December 17, 1960, the 57th anniversary of the first flight. According to one news account, a "slim audience saddened by Friday's airliner collision over New York and Saturday's crash at Munich" attended.[64] The most memorable moment in Mitchell's recollection of the event was a speech by Maj. Gen. Benjamin D. Foulois, who actually watched the Wright brothers test their early planes and flew the country's first army aircraft. Local papers covering the dedication had only compliments for the new visitor

center building, and by early December over one hundred thousand visitors had already passed through its doors.[65]

If the Wright Brothers' legacy was the main focus of dedication day, over the next few years the visitor center building would become the subject of its own articles and press releases. Progressive Architecture had given notice of the design in 1959 and, in 1961, included a floor plan, photograph of the finished building, and close- ups of the concrete wall and terrace design in its profile of "the Philadelphia School."[66] Two years later, the "Kitty Hawk Museum" was a feature of the journal's August issue. The building received praise for its orientation and planning of interior spaces that "make visiting this national park an aesthetic as well as an instructive experience.[67] *Washington Post* architectural critic Wolf Von Eckardt called the visitor center a "simple, but all the more eloquent, architectural statement that honors the past precisely because it does not ape it."[68] The Wright Brothers Visitor Center was also singled out in "Great Builders of the 1960's" a special section of the international publication *Japan Architect* (1970), in the *AIA Journal's* 1971 assessment of Park Service design, "Our Park Service Serves Architecture Well," and as an example of excellent government sponsored architecture in *The Federal Presence* (1979).[69] The fact that Mitchell/Giurgola was hardly a household name in the early sixties, even in professional circles, speaks eloquently of the building's enthusiastic reception by the popular media.[70]

ALTERATIONS TO THE VISITOR CENTER

When Ehrman Mitchell revisited the Wright Brothers Memorial Visitor Center in the mid- 1990s, he was astonished by the changes that had taken place since its dedication over thirty years earlier. Mitchell was particularly bothered by the new fenestration, the areas of exterior concrete wall that had been painted white, and metal sheets covering some of the cypress wood panels. The cypress boards at the edge of the entrance terrace were an artistic "identification" that the Park Service chose to fill- in with ordinary plywood to conform to a standard bench. Mitchell was equally disappointed by changes inside the building. Visitors originally entered the lobby to face a wall of windows looking out over the ceremonial terrace to the flight markers beyond. Today, the doors open into a bookshop and an adjacent information desk. Although the wall of windows and set of double doors still form the facing wall, the view is blocked by shelves, postcard displays and Park Service personnel. Visitors are less likely to use the doors to the terrace, which are now practically behind the information desk. The floors, once vinyl tile, are covered with industrial carpeting. As 1960s photographs illustrate, the original lobby and exhibit area flowed together in a single, spacious and airy room. Today, this sense of openness is compromised by the additional furnishings.

The least visible but most extensive alterations to the building involved heating and air conditioning. The air circulation system required improvement almost immediately. Bids were opened for the work in October 1962, and E. K.Wilson and Sons, Inc., awarded the $5,684 contract. Repairs included the installation of two flow meters and "three- way diverting valves in each of three zones to divert hot and chilled water from units coils."[71] In October 1968, further work was performed on the mechanical systems. The existing heat pump and associated piping and an old three hundred- gallon water tank and twenty- five- gallon compression tank were removed and a new hot water boiler installed. The air- conditioning system was also upgraded.

The most significant aesthetic alteration of the original design was performed by East Coast Construction Company, Inc., contractors from Florida who were awarded the contract for the

refenestration of the building in May 1975. Along with replacing the original glass with safety glass, work included replacing steel window frames with aluminum, replacing steel casement- type ventilation windows with larger, fixed- sash aluminum windows in the assembly room, and altering door dimensions. The most dramatic change in appearance, however, was a matter of color. As 1961- 1962 postcards of the building indicate, the original steel window frames and mullions were bright red- orange, a choice that drew attention to the glass areas of the walls and dome. Architect Don Benson recalls that Ann Massey chose the color to add warmth to the building.[72] The color change, increased thickness of mullions, and adjustments in their locations, resulted in marked visual differences. As much as these changes alter the aesthetic of the building, however, they do not compromise its overall form, affect visitor circulation or jeopardize the integrity of the structure."

While the fenestration project was underway, the park considered a much greater change to its visitor center: the addition of an auditorium and museum extension to the north end of the building. In 1977, the MTMA Design Group of Raleigh, North Carolina, produced a full set of construction drawings for the addition. From the front, the building would appear unaltered, but a circular auditorium was attached to the north side of the assembly room and the museum extended beyond the mechanical room. A circular glider display was included within this area, as was a door into the auditorium. The exterior of the addition continued the general pattern of the building's facade, with rope texture concrete areas separated by panels of wood siding and sandblasted textured areas of concrete. On June 26, 1978, the park sent out an invitation for bids on construction of the addition, along with an expansion of the parking lot and related work. Total costs were estimated at between $250,000 and $390,000. The addition was never constructed, apparently due to lack of funds.

During the 1980s, the Park Service installed stair railings on both terraces and a handicapped access ramp alongside the restrooms. There is also a ramp leading up to the ceremonial terrace. At this time, the park partially enclosed the employee parking lot on the northeast side of the building with a wood fence similar in appearance to the fencing along the visitor parking lot. Most recently, in 1997, a new HVAC system was installed, which resulted in the loss of the two windows on the north side of the building. The covered air duct system, which forms a kind of cornice encircling the assembly room, was painted canary yellow. It is certain that the architects would not have chosen to highlight this aspect of the room in such a fashion.[74]

Professional photographs of the Wright Brothers Visitor Center tend to exaggerate its modern features by emphasizing the shell roof. With the barren site as a backdrop, all sense of proportion is lost. Drawings are equally deceptive; the plan appears plotted on a relentless grid. Even written descriptions distort the building's image by focusing on its relationship to contemporary airport facilities. In fact, the Wright Brothers Visitor Center is a small, relatively understated building. Despite the elevating concrete platform, it sits low in the landscape, allowing the hilltop monument to take center stage. Wright Brothers satisfies Director Wirth's mandate of protection and use. The building focuses on experience- - - leading visitors into the building, introducing a few facts, and then pushing them out to the site. The Wright Brothers Visitor Center was listed in the National Register of Historic Places in February 1998.

In 2000, the Park Service faces growing pressure to supplement its natural and historical parks with theater entertainment and computerized, "interactive" interpretation, both for economic reasons and to sustain public interest. Rather than overshadow the Wright's technology with our own, we might learn from Mission 66 museum specialists who worried that their interpretation

would distract visitors from the park site and guarded against "over- development of exhibits."[75] The Wright Brothers Visitor Center not only commemorates the achievement visitors come to marvel at, but does so without destroying what remains of the historic scene. The launching of the first flight is easy to imagine from the ceremonial terrace or high atop Kill Devil Hill.

Writing in 1997, Romaldo Giurgola recognized that the Wright Brothers Visitor Center might be considered "thoroughly insufficient" for the Park Service's current needs and visitor load. He also insisted that "the design reflected the particular period of American architecture of the early 1960s in which the rigidity of modernism evolved into more articulated solutions integrating internal and external spaces."[76] If architects and architectural historians celebrate the building's role during this period of transition in the design profession, the visitor center's greater importance lies in its status within the history of Park Service planning. Few buildings speak so eloquently about the goals of the Mission 66 program- the effort to bring the public into the action without damaging park resources, the importance of a modern architectural style representative of new technology, and the need for a functional visitor facility suitable for the next generation.

ENDNOTES

1. Robert Perry Rodgers (1895- 1934) and Alfred Easton Poor (1899- 1988) both received their undergraduate architectural education at Harvard University. Rodgers went on to earn a degree from the Ecole des Beaux- Arts in 1920 and work in Bertram Goodhue's New York office. Poor continued his education at the University of Pennsylvania, joining Rodgers in the late 1920s for collaboration on an office building.
2. "Mission 66 for Wright Brothers National Memorial" (National Park Service, Dept. of the Interior, n.d.), Wright Brothers National Monument archives.
3. Andrew M. Hewes, *Wright Brothers National Memorial, An Administrative History* (Washington, D.C.: Department of the Interior, National Park Service, 1967), 26- 7.
4. "'Preliminary General Plan, Kill Devil Hill National Monument," Eastern Division Branch of Plans and Designs, drawing # NM- KDH- 1002, ca. April 1934,Technical Information Center (TIC), Denver Service Center (DSC).
5. "Mission 66 for Wright Brothers," 4.
6. Hewes, *Wright Brothers National Memoria*l, 73.
7. "Preliminary Plan for Wright Brothers Memorial Museum," (3 sh.) drawing #N M EM- KDH- 2014, Regional Planning and Construction Division, February 4,1952,TIC, DSC.
8. Wright Memorial Museum Committee of the Kill Devil Hills Memorial Society, "Prospectus for a Museum to be located at Kill Devil Hills, N.C. to Depict the Life and Accomplishments of Wilbur and Orville Wright," February 1952, "Museum- prospectus" file, Kill Devil Hills Memorial Society Papers (KDHMSP), Outer Banks History Center (OBHC), Manteo, North Carolina.
9. Conrad Wirth to David Stick, ca. August 1958, KDHMSP, OBHC.
10. An estimate of the costs was initially provided by Assistant Director Ronald Lee in June 1952.Wirth repeated the following estimates: roads and walks: $ 150,000; buildings and structures: $600,000; grounds: $186,000; utilities: $38,000; exhibits and furnishings: $230,000; total: $1,204,000. Ronald Lee to Admiral Ramseyjune 10, 1952, KDHMSP OBHC.
11. Among these were William A. Coleman, Inc., Architects of Kingston, N.C., John Erwin Ramsey &Associates, Salisbury, N.C., and Andrew L Pendleton of Design Associates in Statesville, N.C. See "Museum- Misc." file, KDHMSP, OBHC.
12. Suggested Action for the Wright Memorial Museum Committee:' Kill Devil Hills Memorial Society, Ronald F Lee and Ralph V. Whitener, Executive Committee, May 19,1953, KDHMSP, OBHC.
13. See David Stick, "Wright Memorial Museum Committee (1959- 1960):' 2 1; park archives, Fort Raleigh Headquarters, Manteo, N.C.
14. Warren William Cunningham, known as "Barney," worked briefly with Mitchell/ Giurgola before becoming a partner in Geddes, Brecher, Qualls, Cunningham. By the early 1960s, the firm was competing for commissions in the Philadelphia area.
15. Phoebe Stanton, "Mitchell/Giurgola Architects," *Process:Architecture 2* (October 1977): 153.
16. E. Lawrence Bellante and Alfred Clauss also received the contract for the visitor center at Mammoth Cave under construction in 1957- 1958. Mitchell had left the firm by this time and did not recall the project.
17. Interview with Ehrman B. Mitchell by the author, February 9,1999, Philadelphia, Pennsylvania.
18. Interview with Ehrman Mitchell.

19. Mitchell/Giurgola designed residences for Mr. and Mrs. Crockett in Corning, New York, and the Mitchell family in Lafayette Hill, Pennsylvania, in 1958. The Mr. and Mrs. J. E. Steine Residence in Bryan, Ohio, was completed in 1959. Exhibition designs included the Far East Asia Development Project displayed in the New York Coliseum (with Wright and Mitarachi) in 1958, a design for the A.I.A. Philadelphia Chapter Centennial Exhibition (1958), and an exhibition design for the Brooklyn Museum (1959 with Kallman and Mitarachi). The firm also completed "Public Health Center No. 9" for the city of Philadelphia in 1959.
20. Mitchell/Giurgola's University of Pennsylvania parking garage received a gold medal from the Philadelphia chapter of the A.I.A. in 1964. Their submission to the competition for the A.I.A. National Headquarters in Washington, D.C., won first place out of two hundred and twenty- one entries, but inter- agency conflict prevented its construction.
21. The firm designed two other buildings for the Park Service, the Acadia National Park Headquarters Building (1965) in Bar Harbor, Maine, which remained in project form, and a maintenance facility constructed for Independence Park in 1975.
22. Stanton, "Mitchell/Giurgola Architects," *Process: Architecture*.
23. The Gold Medal Exhibition opened at the A.I.A. convention in Honolulu on June 6, 1982. The show traveled to the school of architecture at the University of Hawaii, Honolulu; the Foundation for Architecture, Philadelphia; the Graduate School of Architecture at Columbia University, New York; and the American Institute of Architects National Headquarters in Washington, D.C. See Tony P. Wrenn to Marilyn Harper, February 24, 1997, memorandum, "National Register Status of Visitor Center.
24. For example, architectural historian Phoebe Stanton lists the Wright Brothers Visitor Center as typical of early works departing from "doctrinaire architecture:' and "defined by Kahn's comment on circumstantial and form." See Stanton, "Mitchell/ Giurgola," 158. Kenneth Frampton, author of Modern Architecture, singles out the Wright Brothers Visitor Center as exemplifying the firm's early tendency towards "the superficial aspects of the New Monumentality, as this appeared in the more structurally ostentatious works of Eero Saarinen." See Frampton, "Forward:' in Ehrman B. Mitchell and Romaldo Giurgola, MitchelllGiurgola Architects, (NewYork: Rizzoli International Publications, Inc., 1983), 8.
25. Virginia- Pilot (November 18,1957), 29- A.
26. William Marlin, "On Trying to Understand the Significance of Mitchell/Giurgola," *Architectural Record* (April 1976): 117- 118.
27. See Romaldo Giurgola and Jaimini Mehta, Louis 1. Kahn (Boulder, Colorado: Westview Press, 1975); Romaldo Giurgola with Pamille 1. Berg,"Kahn, Louis I.:' in Adolf K. Placzek, ed., Macmillan Encyclopedia of Architects, vol. 2 (NewYork: Macmillan Publishing Co., 1982), 537- 546.
28. Stanton, "Mitchell/Giurgola," 155.
29. Jan C. Rowan, "Wanting to Be The Philadelphia School," *Progressive Architecture* 42, no. 4 (April 1961): 150- 154.
30. Conrad Wirth, "Mission 66Wright Brothers National Memorial," First Flight Ceremony program, 1957; Conrad Wirth Papers, American Heritage Center, Laramie, Wyoming.
31. Ronald Lee to David Stick, August 14,1958,"Lee, Ronald" file, OBHC.
32. Horace Dough, "Superintendent's Monthly Report:' May 12, 1958, park archives, Fort Raleigh.
33. "Visitor Center Development," drawing #NMEM- WB- 3003 and #3003A, EODC, April 7,1958,TIC.
34. "Mission 66 for Wright Brothers National Memorial," 5.
35. Romaldo Giurgola to Carol Shull, March 4,1997.

36. Telephone Interview with Ehrman B. Mitchell, Jr., January 25, 1999, by the author; Interview with Ehrman Mitchell, February 9,1999.
37. This paragraph is based on examination of over a hundred sketches in the Mitchell/Giurgola Collection at the Architectural Archives of the University of Pennsylvania, Philadelphia.
38. Dough, "Superintendent's Monthly Report," September 12, 1958.
39. Dough, "Superintendent's Monthly Report," January 8, 1959.
40. Hewes, "Wright Brothers National Memorial," 1967.
41. Mitchell, Cunningham, Giurgola, Assoc., August 4,1958, drawing # NMEM- WB 3004, microfiche,TIC.
42. "Two Visitors' Centers Exemplify New Park Architecture," *Progressive Architecture* 40, no. 2 (February 1959): 87.
43. Ronald Lee to David Stick, November 18,1958, KDHMSP, OBHC.
44. "Mission 66 Program to be Initiated at Wright Brothers National Memorial Dual Celebration December 17," press release, National Park Service, November 29, 1957, KDHMSP, OBHC.
45. See "Wright Brothers" museum file, ca. 1962, park archives, Fort Raleigh. This file includes an additional comment by the architects, "Patterned Concrete Wall, Wright Brothers National Memorial:' which reads as follows: "It has attracted many visitors to use it as a background for snapshots and has provoked many questions as to its meaning. It means, simply, that concrete is plastic and may be effectively used to create almost any visual experience, this being one the architects believe to admirably suit the condition of structure, site and deeds."
46. The specifications called for millwork and paneling of "Tidewater Red Cypress" with a "Clear Heart finish." Framing lumber was to be Douglas fir, Hemlock, and southern yellow pine. See "Specifications for Construction of a New Visitor Center to be Located at Wright Brothers National Memorial, Kill Devil Hills, North Carolina," Section GC- 9 "Carpentry & Millwork," 9- 1, park archives, Fort Raleigh.
47. "Kitty Hawk Museum:' Progressive Architecture 44 (August 1962): 117.
48. The first day of bidding, originally scheduled for January 28, took place on February 4,1959. The lowest of seven bids, $218,935 by Wilson H. Wright of Hampton, Virginia, was rejected because it came by telegraph unaccompanied by a bond.
49. Catherine Bishir of the North Carolina State Historic Preservation Office determined that "as a seriously conceived, architect- designed work of mid- twentieth century modernist architecture" the visitor center is both "unparalleled in Dare County and the Outer Banks" and "of exceptional importance to the state of North Carolina. See Bishir, "Evaluation of the Visitor Center (Mitchell/Giurgola, 195 9- 1960), Wright Brothers National Memorial:' North Carolina State Historic Preservation Office, January 15, 1997.
50. "Wright Brothers National Memorial, Monthly Progress Report," February 1959, park archives.
51. Horace Dough, "Superintendent's Monthly Report," May 5, 1959, park archives, Fort Raleigh.
52. Dough, "Monthly Report," August 13, 1959.
53. Dough, "Monthly Report," September 29, 1959.
54. Dough, "Monthly Report," October 12, 1959.
55. Dough, "Monthly Report," January 12, 1960; this team of interior designers worked at the Gettysburg Visitor Center and Cyclorama Building in 1961.
56. Dough, "Monthly Report," July 12, 1960, and August 10, 1960.
57. Cotton Brothers, Inc., the only party to bid on the project, received the contract for $34,228.11 on June 17, 1960. The final inspection was conducted on October 22,1960. "Completion

Report, Planting and Miscellaneous Construction, Wright Brothers National Memorial, Kill Devil Hills, North Carolina:' n.d.

58. Dough, "Monthly Report," August 10, 1960.
59. 171 people visited the Wright Brothers Memorial in August 1998. See "U.S. Department of Interior Monthly Public Use Report:' park archives, Wright Brothers National Memorial.
60. Dough, "Monthly Report," September H, 1960.
61. "Table I: Total Annual Number of Visitors" in "Master Plan for Preservation and Use of Wright Brothers National Memorial, Vol. III, General Park Information Section C: Public Use Data," September 1963.
62. Dough, "Monthly Report," September 14, 1960.
63. Dough, "Monthly Report," October 17, 1960.
64. *News and Observer* (Raleigh, N.C.) (December 17, 1960), clippings file, park archives, Fort Raleigh.
65. "New Wright Memorial Visitors Center at Kill Devil Hills," *Coastland Times* (December 2, 1960).
66. Rowan, "Wanting to Be The Philadelphia School," *Progressive Architecture.*
67. "Kitty Hawk Museum," *Progressive Architecture* 44 (August 1963): 112- 117.
68. Wolf Von Eckardt, "The Park Service Dares to Build Well," *The Washington Post* (March 29,1964), G6.
69. "Our Park Service Serves Architecture Well:' *AIA Journal* (January 1971): 18- 25; Lois Craig, et al, "The Government as Host" in *The Federal Presence* (Cambridge, Massachusetts: MIT Press, 1979),496- 7. "A View of Contemporary World Architecture," *Japan Architect* (July 1970): 65- 78.
70. The firm was also included in the *Macmillan Encyclopedia of Architects, v*ol. 3 (New York: Macmillan Publishing Co., 1982), which noted its "considered response to the urban context and the natural environment, and ... sense of place..."
71. "Bids Have Been Mailed for Wright Center Work:' *Coastland Times* (October 5, 1962); "$5,684 to be spent on Visitor Center Repairs at K.D.H.," *Coastland Times* (November 9, 1962), park archives.
72. Interview with Donald F Benson by the author, March 9, 1999, Lakewood, Colorado; Benson owns four different postcards of the exterior of the building printed in the early 1960s.
73. National Register nomination, additional documentation, August 30,1996.
74. National Register nomination, additional documentation, addendum, October 9, 1997, cover sheet. The additional documentation was approved by the National Register, February 26, 1998.
75. R. H. Lewis, draft, "Reexamination of the Museum Phases of Mission 66," June 22, 1960; Harpers Ferry Archives. A September 1965 addendum to this report singles out the "exact reproduction of the Wright Brothers' powered plane" as one of the "fine specimens" displayed in Mission 66 exhibit areas.
76. In addition, Giurgola wrote that "for new needs a new building, separate from the existing, may be built while the old one could serve well as a meeting place for seminar classes, ceremonial receptions, etc., when properly restored, " Romaldo Giurgola to Carol Shull, March 4, 1997; Ehrman Mitchell to the author, June, 15, 1999.

Historic Paint Finishes Study
Wright Brothers National Memorial
Visitor Center

800 Colington Road, Kill Devil Hills,
North Carolina

December, 2000

National Park Service
Northeast Cultural Resources Center
Building Conservation Branch
Boott Cotton Mills
400 Foot of John Street
Lowell, Massachusetts

Forward

This report outlines the findings of a historic paint finishes study carried out on the Wright Brothers National Memorial Visitor Center, located at 800 Colington Road, Kill Devil Hills, North Carolina. Field work, analysis and report writing were carried out by John A. Scott, an architectural conservator with the Building Conservation Branch, under the terms of that certain Agreement dated November 7, 2000 by and between the National Parks Service's Northeast Cultural Resources Center, Building Conservation Branch (BCB), the Southeast Regional Office (SERO) and the Wright Brothers National Memorial, Manteo, North Carolina. Included in the report is an analysis of the paint finishes found on the interior and exterior elements of the Visitor Center dating from the building's original 1960 construction date to its existing finishes. Historical references contained within this report relied on Mission 66 Visitor Centers, The History of a Building Type, by Sarah Allaback, as well as historic documentation of the building provided by Historical Architect Tommy Jones of the National Park Service's Southeast Regional Office who is currently in the process of writing the Wright Brothers National Memorial Visitor Center, Historic Structure Report.

Introduction

The Wright Brothers National Memorial Visitor Center located at 800 Colington Road, Kill Devil Hills, North Carolina, is a flat-roofed single-story concrete and glass building with a dome-ceiling/roof assembly space executed in the modern architectural style. Along with the assembly space, the building contains an entry lobby, a museum space, offices, a mechanical room, public and private bathrooms, and janitor and storage closets. Associated with the building is an entrance terrace located at the southeastern corner of the building and a "ceremonial" terrace located at the southwest corner of the structure.

Constructed between March, 1959 and June, 1960, the Visitor Center was designed by Ehrman Mitchell and Romaldo Giurgola of Mitchell, Cunningham, Giurgola, Associates, then a newly-formed architectural firm located in Philadelphia.[1] Though changes have occurred to the building since its construction, photographic documentation and study of the Visitor Center's original construction drawings show the structure generally to be in its original configuration. Some of the changes that have occurred to the building include the replacement of, and minor-reconfiguration of a majority of the building's original doors and windows; the reconfiguration of the assembly room's north wall as well as the building's private office spaces; the replacement of the assembly room's original asbestos-laden acoustical ceiling material with non-asbestos containing material; the insertion of wall-to-wall carpet throughout the building; changes in the building's original color scheme; and an updating of much of the building's mechanical systems.

The building which sits on the 428 acre site and welcomes almost 400,000 visitors annually to the Wright Brothers National Memorial was listed in the National Register of Historic Places in 1998. On November 9th of this year the building was recommended to the Secretary of the Interior for National Landmark Status by the National Park Service's Landmarks Committee.

This report outlines the findings of an extensive historic paint finishes study carried out on the both the interior and exterior portions of the Visitor Center. Color matching of the original finishes was carried out using the "Munsell" color notation system, and where necessary the "Benjamin Moore Moor-O-Matic" color system. Appropriate color samples from the two color systems matching the building's original finishes are attached hereto at Appendix "A".

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1. *Allaback, Sarah, Mission 66 Visitor Centers, The History of a Building Type, U.S. Department of the Interior, National Park Service, Cultural Resource Stewardship and Partnerships, Park Historic Structures and Cultural Landscapes Program, Washington, D.C., 2000, pp. 70-84.*

Historic Paint Finishes Study
Wright Brothers National Memorial Visitor Center

Objective: The objective of this historic paint finishes study was to (1) determine the sequence of paint layers applied to the interior and exterior elements of the Wright Brothers National Memorial Visitor Center, and to (2) determine and color match those individual finishes original to the building's 1960 construction date.

Methodology: On November 28, 2000, 34 individual paint samples were removed from the interior and exterior architectural elements of the Wright Brothers National Memorial Visitor Center. These samples were taken from carefully selected areas of the representative elements (believed to contain intact historic paint stratigraphies), using an X-acto knife fitted with a #18 blade. The individual samples were placed in sequentially numbered envelopes and the location and element from which each of the samples were taken was recorded. All paint samples were assigned individual log numbers (WRBR-VC-P001 through WRBR-VC-P034), based on the Integrated Research Organization System (IROS). This system provides a four-part code for each sample that identifies not only the individual sample, but also the site and structure from which the sample was taken. Subsequently, all paint samples were packaged and transported to the paint laboratory of the Northeast Cultural Resources Center in Lowell for analysis.

In the lab, the samples were mounted in individual numbered petri-dishes, previously filled with micro-crystalline wax. The samples were then analyzed and photographed using a stereo-zoom binocular microscope at 10x-70x magnification. Chromochronologies for the individual samples were recorded on 3"x5" paint analyses cards corresponding to the sample numbers assigned in the field. All paint samples and paint analysis cards are stored at the Northeast Cultural Resources Center, Building Conservation Branch in Lowell, and are available for further study.

The following historic paint finishes study is based on a detailed examination of the above-referenced samples. Color chromologies have been recorded for each sample, and color matching has been carried out using Munsell color notation and Benjamin Moore Moor-O-Matic color systems.

Paint Analysis Data and Conclusions

Exterior

Data

A. Location of Removed Paint Samples

3 individual samples were removed from the painted **Exterior** elements of the Wright Brothers National Memorial Visitor Center at the following locations:

Sample No.	Location Description
WRBR-VC-P001	Roof-top metal facia, northwest corner of building
WRBR-VC-P002	Cement-plaster soffit at west side of building
WRBR-VC-P003	Western most metal-post of the original board fence located east of building

B. Sample Chromochronologies

Under microscopic examination the following paint layers were identified for the given samples removed from the **Exterior** of the Wright Brothers National Memorial Visitor Center:

Sample Nos.	**P001**	**P002**	**P003**
Substrate	Metal	Cement-Plaster	Metal
(P)		Cream-White	Lt. Orange
1960	(Unfinished)	Lt. Yellow	Orange
(P)	↓	Red	Red
2nd Finish	↓	Red	Red
3rd Finish	↓	Bright Yellow	Lt. Gray
(P)	↓	↓	Gray
4th Finish	(tar roof residue)	↓	Blue-Gray
(P)	↓	White	Lt. Gray
5th Finish	↓	Lt. Yellow	Gray
6th Finish	↓	↓	Gray
(P)	White	↓	↓
7th Finish	Off-White	Canary Yellow	Gray
8th Finish	↓	↓	Gray

Throughout this report, the symbol "(P)" represents a primer layer.

Conclusions (Exterior)

A. Facia

Analysis of paint sample P001 removed from the metal facia of the Visitor Center roof indicates that this element of the building was originally unpainted. Under microscopic examination of the sample, the only discernible finish found on the element is the existing white-colored paint which was applied over an off-white colored primer. However, between this finish and the metal substrate of the element is also seen an tacky brown-colored substance which is believed to be tar residue from repairs carried out on the roof prior to the painting of the facia.

B. Soffit

Analysis of paint sample P002 removed from the cement-based plaster soffit at the west side of the building indicates that this element of the building was originally painted light-yellow falling between Munsell colors 2.5Y 9/2 and 2.5Y 9/4 (2.5Y 9/3) and more closely matching Benjamin Moore "Moor-O-Matic" color #170. This finish was applied over a cream-white colored primer. The original light-yellow finish was subsequently replaced with a red-colored paint similar to the 4th paint layer found on the sample removed from the metal fence post (see item C below). In later years the red-colored finish was replaced with a bright-yellow finish, a light yellow-colored finish similar to the original finish and finally with the existing "canary" yellow-colored finish we see today.

Fig. 1 Detail of Facia and Soffit of Wright Brothers National Memorial Visitor Center, West Elevation, (2000).

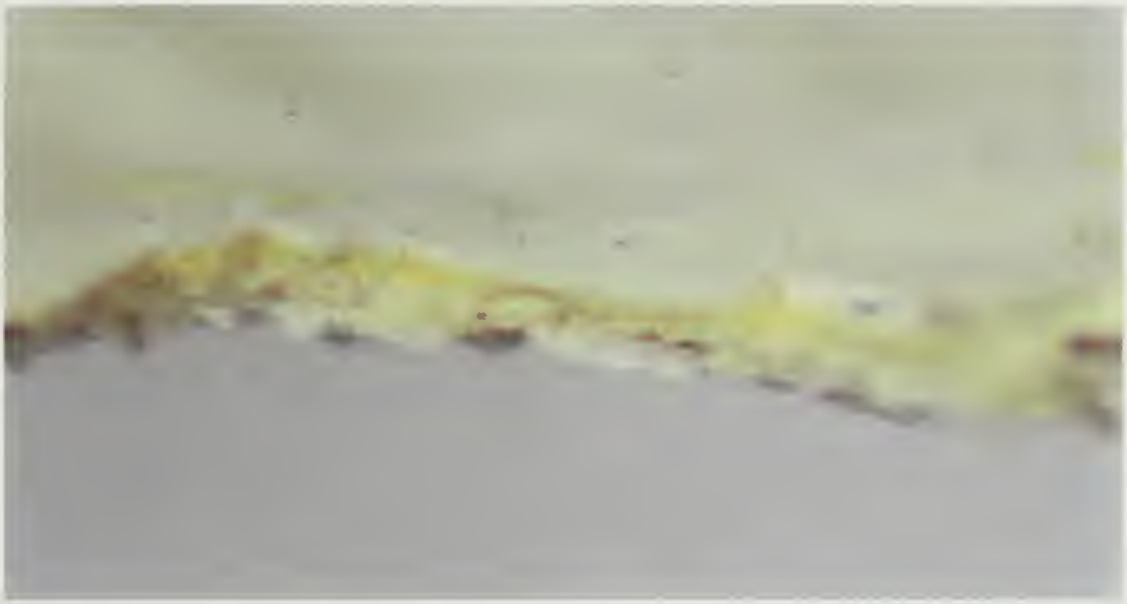

Fig. 2 Paint Sample WRBR-VC-P002 removed from Exterior Facia of Wright Brothers National Memorial Visitor Center, Viewed at 30x. Note Original Light-Yellow Finish and Cream-White Primer Beneath Later Bright Yellow Finish (Intermediate Red-Colored Finish is not Visible in Photograph), (2000).

C. Fence Posts

Original painting specifications for the building indicate that exterior ferrous metal elements were to be painted with a rust inhibitive primer and 2 coats of "Noxide" metal paint. Under microscopic examination of paint sample P003 removed from the western most metal fence post located east of the Visitor Center, a light orange-colored primer can be seen beneath what appears to be the 2-coat original finish applied to the fence posts. This original finish is an orange-colored paint matching Munsell color 2.5YR 6/16. This finish was subsequently replaced with a red-colored paint and later with a series of gray-colored paints. The red finish which matches Munsell color 10R 3/4 is very similar to the second finish found in the sample removed from the buildings exterior soffit and was likely applied in the late 1960's or early 1970's based on the number of subsequent paint layers found on these elements.

Fig. 3 Paint Sample WRBR-VC-P003 removed from Fence Post East of Wright Brothers National Memorial Visitor Center, Viewed at 30x. Note Original Orange Finish and Primer Coats. Later Red-Colored Finish is Believed to Date from Late 1960's or Early 1970's, (2000).

Lobby

Data

A. Location of Removed Paint Samples

7 paint samples were removed from the **Lobby** of the Wright Brothers National Memorial Visitor Center at the following locations:

Sample No.	Location Description
WRBR-VC-P004	Radiator cover at east wall
WRBR-VC-P005	Troweled edge of concrete column at east wall
WRBR-VC-P006	Recessed metal trim of east wall
WRBR-VC-P007	Tongue and groove cypress wood surface of south wall having a glossy appearance
WRBR-VC-P008	Tongue and groove wood surface of south wall having a faded gloss appearance
WRBR-VC-P009	Concrete ceiling beam which transverses room in an east / west direction
WRBR-VC-P010	Acoustical ceiling tile found above modern drop ceiling

B. Sample Chromochronologies

Under microscopic examination the following paint layers were identified for the given samples removed from the Visitor Center **Lobby**:

Sample Nos.	**P004**	**P005**	**P006**	**P007, 008**	**P009**	**P010**
Substrate	Metal	Concrete	Metal	Wood	Concrete	Styrofoam
(P)			Red			
(P)	White		Lt. Orange			
1960	Orange	(unfinished)	Orange	"Satinlaq" & Wax	(unfinished)	Dk. Blue
2nd Finish	Red-Orange		↓	↓	↓	↓
(P)		White	↓	↓	White	↓
3rd Finish	Yellow-Orange	White	↓	↓	White	↓
(P)	Brown	↓	↓	↓	↓	↓
4th Finish	Dk. Brown	Gray	Dk. Brown	Varnish	↓	↓
5th Finish	Brown	Lt. Gray	↓	↓	Lt. Gray	↓
6th Finish	Brown	Brown	Brown	↓	↓	↓

"(P)" represents a primer layer

Conclusions (Lobby)

A. Metal Base and Wall Trim, Original Window and Door Frames

Analysis of paint sample P006 removed from the metal trim at the room's east wall indicates that these elements of the room were originally primed with a red-colored metal primer and an orange-colored paint primer. Over the orange paint primer was applied the element's original finish coat, which was an orange-colored paint matching Munsell color 2.5YR 6/16. This orange-colored finish was subsequently painted over with a dark brown-colored paint and later with the existing brown-colored paint we see today.

Historic color photographs of the building indicate that the original orange paint finish found on the room's metal trim elements was also likely applied to the building's original steel window and door frames, which have since been replaced with the existing brown-colored aluminum frames.

Fig. 4 Original Orange-Colored Finish and Primers Found on Interior Metal Trim of Wright Brothers National Memorial Visitor Center (Munsell Color Chip 2.5YR 6/16 Visible in Lower Right Corner of Photograph), (2000).

B. Radiator Covers

Analysis of paint sample P004 removed from one of the radiator covers located along the east wall of the room shows that this element of the room was also finished with the above referenced orange-colored paint at the time of the building's construction. This finish however which matches Munsell color 2.5YR 6/16 does not have the orange-colored primer found associated with the room's metal trim elements. Instead, what was likely a factory applied white-colored finish was utilized as the primer layer of the orange paint finish. Subsequent finishes associated with the radiator covers include an even brighter red-orange colored paint finish, a yellow-orange paint finish and at least two brown-colored finishes.

C. Wooden Wall Surfaces

Historic documentation indicates that the tongue and groove cypress-wood wall surfaces of the room were originally finished with 3 coats of "Satinlac" and wax.[1] Today the wooden walls of the room have a semi-glossy appearance due to a subsequent finish, which based on paint samples P007 and P008 removed from the south wall of the room, appears to be a polyurethane based varnish.

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1. 1958 Visitor Center Specifications, p. 5.

Fig. 5 Lobby of Wright Brothers National Memorial Visitor Center, East Wall, Showing Original Cypress Board Wall and Concrete Column, (2000).

D. Troweled Edges of Concrete Columns and Concrete Ceiling Beams

Paint samples P005 and P009 removed from the troweled edge of one of the east wall's concrete columns and one of the exposed concrete ceiling beams in the lobby indicate that neither of these elements were originally painted. The first finish that is found on these elements is a white-colored paint that likely corresponds to the 3rd finish found on the room's radiator covers and was probably applied in the mid to late 1970's.

E. Ceiling Tiles

Analysis of paint sample P010 removed from the original acoustical ceiling tiles found above the modern drop ceiling shows this element of the room to have only its original dark-blue finish present. This finish matches Munsell color 2.5PB 3/2. This finish was also applied to the exposed mechanical systems at the ceiling level to help them blend into the ceiling. A perforated (honeycomb) black-colored metal drop ceiling located beneath the ceiling-hung mechanical systems also helped to conceal their appearance; however, the metal drop ceiling was later replaced with the solid white-colored drop ceiling found in the room today.

F. Soffits

See "Conclusions" for Museum / Exhibit Space of this report.

Museum / Exhibit Space

Data

A. Location of Removed Paint Samples

7 paint samples were removed from the **Museum / Exhibit Space** of the Wright Brothers National Memorial Visitor Center at the following locations:

Sample No.	Location Description
WRBR-VC-P011	Metal edging of display stand in center of room
WRBR-VC-P012	Rubber tile baseboard trim
WRBR-VC-P013	Tongue and groove cypress wood surface of west wall
WRBR-VC-P014	Cement-plastered column at west wall
WRBR-VC-P015	Ceiling soffit at west wall
WRBR-VC-P016	Perforated (honeycomb) metal drop ceiling
WRBR-VC-P017	Concrete ceiling beam

Fig. 6 Museum / Exhibit Space of Wright Brothers National Memorial Visitor Center, West Wall, Showing Original Cypress Board Walls, Painted Columns, Metal Drop Ceiling and Yellow Soffits (2000).

B. Sample Chromochronologies

Under microscopic examination the following paint layers were identified for the given samples removed from the **Wright Brothers National Memorial Visitor Center**:

Sample Nos.	**P011**	**P012**	**P013**	**P014**	**P015**	**P016**	**P017**
Substrate	Metal	Rubber Tile	Wood	Plaster	Plaster	Metal	Concrete
(P)	Red	↓					
(P)	Lt. Orange	↓		Cream-White	Cream-White		
1960	Orange	↓	"Satinlaq" & Wax	Cream-White	Light-Yellow	Black	(unfinished)
(P)	↓	↓	↓	White	White	↓	↓
2nd Finish	Red-Orange	↓	↓	Cream-Ylw	Cream-Ylw	↓	↓
3rd Finish	Ylw-Orange	↓	↓	↓	Bright-Ylw	↓	↓
4th Finish	Dk. Brown	Dk.Brown	Varnish	Beige	Yellow	↓	Beige
5th Finish	↓	↓	↓	Off-White	Ylw-Green	↓	Off-White
(P)	↓	↓	↓	↓	Yellow	↓	↓
6th Finish	Brown	↓	↓	White	Yellow	↓	White

"(P)" represents a primer layer

Conclusions (Museum / Exhibit Space)

A. Metal Trim Associated with Display Stand in Center of Room

Analysis of paint sample P011 removed from the metal edge of the display stand located in the middle of the Museum / Exhibit Space indicates that this element of the room was painted with the same orange-colored paint found on the metal trim pieces of the lobby and the exterior fence posts at the time of the building's construction in 1960. This orange paint which was applied over a lighter orange-colored paint primer and a red-colored metal primer, matches Munsell color 2.5YR 6/16. Subsequent finishes found in the sample include the red-orange, yellow-orange, dark brown and brown finishes found on the radiator covers in the lobby, indicating that the paint scheme for these two spaces of the Visitor Center were, at least in part, coordinated throughout the life of the building.

B. Rubber Tile Baseboard Trim

Analysis of sample P012 removed from the rubber tile baseboard trim along the west wall of the room shows that this element of the room was unpainted until the dark brown-colored paint that now exists on its surfaces was applied.

C. Wood Wall Surfaces

Historic documentation indicates that the tongue and groove cypress-wood wall surfaces of the room were originally finished with 3 coats of "Satinlac" and wax.[1] Today the wooden walls of the room have a semi-glossy appearance due to a subsequent finish, which based on paint sample P013 removed from the west wall of the room, appears to be a polyurethane based varnish.

D. Plastered Columns

Analysis of paint sample P014 removed from one of the plastered columns along the west wall of the room indicates that this element of the room was originally finished with a cream-white colored primer and paint which is close to Munsell color 2.5Y 9/2 and matches Benjamin Moore "Moor-O-Matic" Ready Mix Color "Cameo White." This finish was subsequently

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1. 1958 Visitor Center Specifications, p. 5.

replaced with a cream-yellow colored paint and then a beige, an off-white, and finally the white-colored finish we see on the columns today.

E. Soffit

Paint sample P015 removed from the soffit along the west wall of the room shows that this element of the Museum / Exhibit Space and the Lobby of the Visitor Center were originally finished with the same light yellow-colored paint found on the exterior soffits of the building. This light-yellow color falls between Munsell colors 2.5Y 9/2 and 2.5Y 9/4 (2.5Y 9/3) and more closely matches Benjamin Moore "Moor-O-Matic" color #170. This finish that was applied over a cream-white colored primer (likely the Pratt & Lambert Primafil called for in the building's 1958 specifications), was subsequently painted over with cream-yellow colored paint and then a very bright yellow-colored paint. In recent years the soffits of the rooms have been finished with a number of yellow and yellow-green colored finishes including the "canary" yellow-colored paint we see applied to their surfaces today.

F. Honeycomb Drop Ceiling Panels

Paint sample P016 removed from one of the metal perforated (honeycomb) drop ceiling panels in the Museum / Exhibit Space shows that only the original black-colored finish we see today has been applied to this element of the room. This finish appears to be a factory applied baked on finish as no primer layer was evident under microscopic examination. This paint has a matte finish and matches Munsell color N0.5/.

G. Ceiling Tiles

See "Conclusions" for Lobby of this report.

H. Concrete Ceiling Beams

Paint sample P017 removed from one of the room's exposed concrete ceiling beams indicates that this element of the ceiling was not originally painted. The first finish applied to this element of the room is a beige-colored paint that matches the 4th finish found on the room's plastered columns. Subsequent finishes found in the sample also correspond to the later finishes found in the sample removed from one of the room's columns (P014), indicating that the earliest beige-colored paint found in the ceiling beam sample was likely applied to that element in the late 1970's or early 80's.

Assembly Room

Data

A. Location of Removed Paint Samples

13 paint samples were removed from the **Assembly Room** of the Wright Brothers National Memorial Visitor Center at the following locations:

Sample No.	Location Description
WRBR-VC-P018	Metal trim at east wall
WRBR-VC-P019	Troweled edge of concrete column at east wall
WRBR-VC-P020	Original soffit next to east wall of room
WRBR-VC-P021	Ceiling between assembly room and Lobby/Exhibit area
WRBR-VC-P022	Base of independent column at southeast corner of room
WRBR-VC-P023	Independent concrete column at southeast corner of room
WRBR-VC-P024	Cover of soffit mounted lamp
WRBR-VC-P025	Bracket on side of soffit mounted lamp cover
WRBR-VC-P026	Conduit box for soffit mounted lamp
WRBR-VC-P027	Metal tie-rod at west clerestory window
WRBR-VC-P028	Ceiling
WRBR-VC-P029	Mounting bracket for lamp
WRBR-VC-P030	Vertical face of clerestory window lintle

Fig. 7 Assembly Room of Wright Brothers National Memorial Visitor Center, West Elevation, (2000).

B. Sample Chromochronologies

Under microscopic examination the following paint layers were identified for the given samples removed from the **Assembly Room** of the Wright Brothers National Memorial Visitor Center:

Sample	**P018**	**P019**	**P020, 021**	**P022**	**P023**
Substrate	Metal	Concrete	Plaster	Tile	Concrete
(P)	Red				
(P)	Lt. Orange		Cream-White		Cream-White
1960	Orange	(unfinished)	Light-Yellow	(unknown)	Cream-White
(P)	↓	↓	White	↓	↓
2nd Finish	Red-Orange	↓	Yellow	↓	↓
(P)	↓	White	↓	↓	↓
3rd Finish	Ylw-Orange	White	↓	Black	White
(P)	↓	↓	↓	↓	↓
4th Finish	↓	Gray	Ylw-Green	↓	Gray
(P)	↓	↓	↓	↓	Blue-Gray
5th Finish	Dk. Brown	↓	↓	↓	Blue-Gray
(P)	↓	↓	↓	↓	↓
6th Finish	↓	Lt. Gray	Yellow	↓	Lt. Gray
(P)	↓	↓	↓	↓	↓
7th Finish	Brown	Brown	Yellow	↓	White

Sample	P024, 025, 029	P026	P027	P028	P030
Substrate	Metal	Metal	Metal	Concrete	Concrete
(P)	Gray				
(P)	Dk. Blue		Lt. Orange		
1960	Dk.Blue	Cream-White	Orange	(unknown)	(unfinished)
(P)	↓	↓	↓	↓	↓
2nd Finish	↓	↓	Green	↓	↓
(P)	↓	↓	Ylw-Orange	↓	↓
3rd Finish	↓	↓	Ylw-Orange	↓	↓
(P)	Off-White	White	↓	Gypsum	↓
4th Finish	Off-White	Gray	Black	White	White
(P)	↓	↓	↓	↓	↓
5th Finish	↓	Blue-Gray	↓	↓	Blue-Gray
(P)	↓	↓	↓	↓	↓
6th Finish	↓	↓	↓	↓	↓
(P)	↓	↓	↓	↓	↓
7th Finish	White	↓	↓	↓	↓

"(P)" represents a primer layer

Conclusions (Assembly Room)

A. Metal Trim of Walls and Baseboards; Tie-rods at Clerestory Windows

Analysis of paint sample P018 removed from the metal trim associated with the east wall of the room shows that this element was originally finished with an orange-colored paint matching Munsell color 2.5YR 6/16. Subsequent finishes found on this element of the room include an even brighter red-orange colored finish, as well as subsequent yellow-orange, dark brown and brown-colored paint finishes.

Fig. 8 Detail of Metal Baseboard Trim in Assembly Room of Wright Brothers National Memorial Visitor Center. Note Original Orange Finish, and Later Red-Orange, Dark Brown and Brown-Colored Finishes, (2000).

Sample P027removed from one of the metal tie-rods associated with the room's arched clerestory windows shows that the original finish applied to these elements of the room were also painted the above referenced orange color in 1960. Surprisingly, the second finish found on this element was a green-colored paint, which was not found in any other samples removed as a part of this study. The third finish applied to the tie-rods reverted to the more typical orange

colors found throughout the building. This finish was subsequently painted over with the existing black-colored paint found on these elements today.

B. Troweled Edge of Concrete Columns

Analysis of paint sample P019 and P005 removed from the troweled edges of concrete columns in the Assembly Room and the Lobby, respectively, indicate that these elements of the building were originally unpainted. The first finish applied to these elements, a white-colored paint, was likely not applied until the middle 70's or early 1980's.

C. Soffits in Assembly Room and Ceiling in Hall Leading to Assembly Room

Paint samples P020 and P021removed from the original soffit next to the east wall of the Assembly Room and the ceiling of the hall leading to the Assembly Room, respectively, indicate that like the soffits in the Museum / Exhibit space and the building's exterior soffits, these elements associated with the Assembly Room were originally finished with a light yellow color paint falling between Munsell colors 2.5Y 9/2 and 2.5Y 9/4 (2.5Y 9/3), and more closely matching Benjamin Moore "Moor-O-Matic" color #170. Subsequent finishes found in these paint samples were also yellow in color though they vary from the original yellow finish specified above.

Fig. 9 East Wall of Assembly Room Showing Original Lighting Fixtures, Arched Clerestory Window and Dome Ceiling. Note also the Original Cypress Wall, Enlarged Soffit, and Both the Finished and Unfinished Concrete Columns, (2000).

D. Tile at Base of Columns

Analysis of the sample removed from the base of the concrete column found in the southeast corner of the room indicates that this tile is made of a different material than the tile found associated with the baseboard in the Museum / Exhibit space. This tile which appears to be composed of a bituminous material is probably a replacement product as the finishes schedule found on the construction drawings for the building indicates that this element would likely have matched the rubber tile material found associated with the baseboards in other parts of the building. If this element of the room is in fact a replacement material, it was in all likelihood introduced into the building at the time the room was carpeted.

E. Surface of Painted Concrete Columns

Paint sample P023 removed from the surface of the column in the southeast corner of the room indicates that this element was originally finished with the same cream-white colored paint originally found on the columns of the Museum / Exhibit Space. This cream-white colored finish is close to Munsell color 2.5Y 9/2, and matches Benjamin Moore "Moor-O-Matic" Ready Mix Color "cameo white." The original finish found on the column was subsequently replaced by a number of white and gray-colored finishes. This element was also painted more frequently than other elements in the room likely due to its location.

F. Lamps and Associated Elements

The soffit mounted lamps and support brackets found in the Assembly Room were originally finished with a dark blue paint matching Munsell color 10B 2/6. This finish was applied over a dark blue-colored paint primer and a gray-colored metal primer. The lamps were painted twice more in their history with an off-white colored finish and the existing white-colored finish.

Fig. 10 Original Lamp, Mounting Bracket and Metal Conduit Box Located Beneath the Concrete Soffit of the Assembly Room, Wright Brothers National Memorial Visitor Center, (2000).

Fig. 11 Paint Sample WRBR-VC-P024 removed from an Original Light Fixture in the Assembly Room of the Wright Brothers National Memorial Visitor Center, Viewed at 40x. Note Original Zinc Powder Metal Primer, Dark Blue Paint Primer and Original Dark Blue Finish, (2000).

The metal conduit box associated with the room's lamps and found at the soffits appear to also have been originally finished with paint as three paint finishes were also found on the sample removed from this element (P026). The original finish found on these elements was the same cream-white colored paint found on the room's painted concrete columns which is close to Munsell color 2.5Y 9/2, and matches Benjamin Moore "Moor-O-Matic" Ready Mix Color "cameo white."[1]

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1. *Of note, the sample removed from the conduit box indicated that the original finish was in very poor condition prior to the second finish being applied. Further, as no paint or metal primer was found associated with the original finish, the painting of this element may have actually been an after thought, applied shortly after the building was constructed in order to give the lamp assembly a more finished appearance.*

G. Ceiling

Paint sample P028 removed from the domed ceiling of the Assembly Room showed a single white-colored paint finish applied to what is believed to be replacement acoustical spray material consisting of mica, gypsum and possibly vermiculite materials. Examination of the sample under a polarized light microscope at 40X also verified the absence of asbestos fibers, which the original ceiling material is purported to have contained.

Fig. 12 **Replacement Acoustical Ceiling Material, Wright Brothers National Memorial,Visitor Center, Assembly Room, Viewed at 10x, (2000).**

H. Facia of Lintel at Clerestory Windows

Paint sample P030 removed from the facia of the arched lintel at the room's west facing clerestory window, indicates that in all likelihood this element of the ceiling/wall was not painted until the replacement ceiling material was introduced into the building (1980's). At that time, the concrete surface was painted off-white matching the newly applied ceiling. Later, the face of the lintels of the room were finished with the gray-colored paint we see on their surfaces today.

Office Area

Data

A. Location of Removed Paint Samples

4 individual samples were removed from the **Office Area** of the Wright Brothers National Memorial Visitor Center at the following locations:

Sample No.	Location Description
WRBR-VC-P031	Door jamb at janitors closet
WRBR-VC-P032	Door surface of janitors closet
WRBR-VC-P033	Cement masonry unit at south wall of space
WRBR-VC-P034	Concrete column at west wall of space

B. Sample Chromochronologies

Under microscopic examination the following paint layers were identified for the given samples removed from the **Office Area** of the Wright Brothers National Memorial Visitor Center:

Sample Nos.	**P031**	**P032**	**P033**	**P034**
Substrate	Metal	Metal	CMU	Concrete
(P)	Red-Brown / Gray			
(P)	Lt.Yellow (from adjacent wall)			
(P)	Lt. Orange	White	Cream-White	White
1960	Orange	Green	Light-Yellow	Cream-White
(P)	↓	Lt. Green	↓	↓
2nd Finish	Red-Orange	Green-Yellow	Bright-Yellow	Lt.Yellow
3rd Finish	↓	Mint Green	White	White
4th Finish	Dark Brown	Cream	Cream	Cream
5th Finish	Brown	White	White	↓

Throughout this report, the symbol "(P)" represents a primer layer.

Conclusions (Office Area)

A. Door Jambs

Analysis of paint sample P031 removed from the door jamb of the building's Janitor's Closet indicates that like all of the metal trim work found in the building, the door jambs of the Office Area were also originally finished with an orange-colored paint matching Munsell color 2.5YR 6/16. This finish was applied over a lighter orange-colored primer, as well as original light-yellow paint from the adjacent wall surface. Also present beneath the original orange-colored finish is a "shop" applied red-brown primer and what is likely a touch-up primer specified in the building contract at page 15-3 (Painting and Caulking). Subsequently, three other finishes were applied to this element; the brighter red-orange colored finish found as the second finish on the metal trim work throughout much of the building; a dark brown-colored finish; and the brown-colored paint we see today.

Fig. 13 Paint Sample WRBR-VC-P031 Showing Original Red-Brown and Gray-Colored Primers, Yellow-Colored Paint Found on CMU Wall Surfaces, and Orange-Colored Paint Found on Door Jambs in Office Area of Wright Brothers National Memeorial, Visitor Center (Viewed at 50x), (2000).

B. Door Surfaces

Analysis of paint sample P032 removed from the door of the Janitor's Closet shows that this element of the building was originally painted green matching Munsell color 7.5GY 5/2. Later finishes applied to the door's surface include two lighter green-colored finishes as well as a cream and the white-colored finish found on the door today.

Fig. 14 Paint Sample WRBR-VC-P032 Removed from a Door in the Office Area of the Wright Brothers National Memorial Visitor Center, Showing Original Green-Colored Paint and White-Colored Primer (Viewed at 30x), (2000).

C. Cement Masonry Unit Wall Surface

Analysis of paint sample P033 removed from the Office Area's south wall indicates that the original color of the space's walls was the same light yellow-color found at the soffits of the building and the ceiling leading into the Assembly Room. This light yellow-colored paint falls between Munsell colors 2.5Y 9/2 and 2.5Y 9/4 (2.5Y 9/3), and more closely matches Ben-

jamin Moore "Moor-O-Matic" color #170 **(see Fig. 13)**. Subsequent finishes found in the sample included a bright yellow-colored paint, as well as white and cream-colored paints.

D. Surface of Painted Concrete Column

Paint sample P034 removed from the surface of the concrete column along the west wall of the room indicates that this element was originally finished with the same cream-white colored paint originally found on the columns of the Museum / Exhibit Space and the Assembly Room. This cream-white colored finish is close to Munsell color 2.5Y 9/2, and matches Benjamin Moore "Moor-O-Matic" Ready Mix Color "cameo white." The original finish found on the column was subsequently replaced by light-yellow, white, and the cream-colored finish we see on its surface today.

APPENDIX A

Munsell and Benjamin Moore
Color Samples

Munsell Color:2.5YR 6/16

Munsell Color:2.5PB 3/2

Munsell Color:10B 2/6

Munsell Color:7.5GY 5/2

Benjamin Moore Moore-O-Matic Colors

Benjamin Moore Color:170

Benjamin Moore Ready Mix Color: "Cameo White"

Interview with Ehrman Mitchell

Interviewed by

Jack Pyburn, Historical Preservation Architect, Office of Jack Pyburn Architect

Jon Buono, Historical Architect, Southeast Region, National Park Service

Jack Pyburn (JP):Mr. Mitchell, I'd like to start out with you providing a little background on your formative time (professionally) and the things you, and to the degree you want to talk about Mr. Giurgola's formative time as you know it, were formative and influenced the approach and outcome of the Wright Brothers Visitor Center.

Ehrman Mitchell (EM):Well, that's a big order. I would say that the main thing we were trying to do is feel our way on how to design, more or less, a major project for us. How we were going to that and how were we going to get ideas on paper in time to feed them to the park services. That whole story was an incredible thing anyway, so…

JP:In terms of the time schedule to deliver the project?

EM:In terms of the time schedule. Exactly.

JP: Well let me back up just one step and just, in terms of a particularly educational standpoint, what were the influences in your education that you look back and say 'those were the things that influenced me on architecture'?

EM:Jack, I have to tell you my education in architecture at the University of Pennsylvania was fine, but it never really got around to teaching me how to think about architecture. And when I joined with Giurgola, that's when I began to think about architecture and what it really means, and what it can mean, and that was ten years after I left to University of Pennsylvania before I met him. But we got going as a result really of Bill Cabot from the Eastern Design Office (of the National Park Service) here selecting us to do the Wright Brothers job. Now I can only impart to you what he told me one time. I asked him, Jack, how come we got this job. And he said, 'Well, Mitch, I had eight projects on the boards here that the government said for me to get them out on the street. And I knew seven architects, and then you guys came along.'. We just joined up and told him that we were starting a practice probably three months before when he came to us with this project, and I can remember it so well because he called up and he said, this was in March, he said, 'Mitch, I think I have a project for you. Why don't you come on over to the house on Sunday, I'll roll it out and we'll look it over'. I thought, 'Fine, gee. That's great.' We get to do it a storage unit for the tennis rackets at the courts down there. Tennis court or something. We went out there, and he rolled out this Wright Brothers National Memorial thing and took about two to revive me. I couldn't believe what I was seeing. And he said, 'No, I want you guys to do it'. So our approach was to try to do this project in a way that it would go beyond the norm of thinking about what architecture is. Thinking about what is it that contributes to the cultural stamina of an era. What is it? That was primarily the driving force was to find something that would contribute to the architectural capital, intellectual capital, if you will. My feeling is that we succeeded in doing that. Aldo, my partner, he hadn't talked about it much, although he's very enthused about having giving the design direction he did.

JP:Did he not talk about it because he just didn't talk about projects, or…

EM:Yes, I think that's it.

JP:Or because he wasn't verbally oriented as much?

EM:Yes. The Wright Brothers really was so significant in our beginning, but once we got going, we didn't look back.

JP:One of the things I do remember reading was that both of you all in the previous firm, I gather, where you met had done some work for that firm for the Park Service. And so I gather from that, that while your modesty about being the only firm he knew, it was obviously an appreciation for what you had contributed in that previous work and how that work, how he saw that being something that was valuable to this project. Is there anything about that...

EM:Yes, I think that is exactly what it is, Jack. I really do. I didn't want to presume to say all that, but since you said it, that's exactly what it was. Bill Cabot was trying to get two visitor centers through this firm that we were working with. And we were all there. Then I got to know Bill. We got involved in one or two ways. I don't know any specific time we talked architecturally about it, but I do remember we did and he more or less mentioned the fact he felt he could trust the two of us, because of our working together in the firm before. That's what brought him to that realization. And he was almost right.

JP:I'm interested of all of the people you and Giurgola crossed paths with up to that point, what were the things that made you all decide that the two of you were the ones that wanted to practice with each other?

EM:Well, one day in the other office, we were talking our future. He (Aldo) was involved in a magazine in New York doing the graphic design. I think it was Interiors (Magazine). At the time in New York, he was doing that. And he was also teaching at Penn when he was also consulting at this firm where I was. It was too much for him. And I was getting to the point in the firm where I had been asked to take on a partnership there, and I just really didn't want to, because these people were not engaged architecturally enough for me. It just wasn't right for me, anyway. Those two things came together when we were talking, that I felt that I was going to have to move on somehow somewhere. He was changing his status in New York and Philadelphia, and he said, 'You know, I think we should try a project'. And I said, 'Fine. Let's do it. Let's try one'. Well what that means is when you get the first project, you got to get out and get the second one. So, that's what that means. So, that's what we did. And there was a funny thing that happened during the course of this work we had made our schematic sort of preliminary design proposal to the powers that be down there, and from that time on over the summer, I didn't hear anything from Cabot. Nothing to do with the next move, so I was out hunting around for other jobs and so forth. I think, in September he came to me and said, 'Mitch, where are the working drawings'. And I said, 'Working drawings? What working drawings?' And he says, 'You're supposed to be doing the working drawings'. I said, 'We are? I didn't know that. I thought you had to write me a letter and tell me this is approved. Then I'll take the next step.' I don't remember what he said about that. Anyway, he said, 'Well, I'm supposed to have this project done', street and so forth. This was the

end of September. And I said to him, 'Alright Bill, you tell me the dates you want this project, and I will see that it is there on that date'. He said December 7th. That gave us two months to do the working drawings. And I was so blown out of my mind, I figured that we had to do it, because you can't have a client, your first client, who says, 'Oh well, they were nice guys, but they couldn't produce'. You know? So we produced it.

JP:Some things never change.

EM:Yeah. That's right. I took the job in to the Park Service, to his office on the 7th of December, as he had asked. The drawings, specifications, the whole works. You know when he looked at them? The 15th of January. I was so god damn mad.

Jon Buono (JB):Would you say the Eastern Design Office was very busy back then?

EM:I don't know if they were so busy. I don't know what his problem was. All I know is that just didn't tell me to go ahead. He never even said anything about it. Nothing.

JP:You thought you were just waiting for approval.

EM: And then I didn't press him, because I was trying to get this other new job. And I thought, 'Well, I haven't heard anything, so I'm not doing anything'. That's what happened. It was a big mistake on my part. I probably should have called him and said, 'Bill, have we got your approval on this to go ahead or what? What's the story?' But I didn't, because I almost didn't want to, because I wanted to do this other thing.

JP:What was the other thing?

EM:Well, I was trying desperately to get a job near here which was called the American College of Life Underwriters. Insurance guys that wrote, they were really the professional arm of life insurance business. They had just reached the point where they were going to start a suburban campus of buildings, and do their academic educational program for the industry. I knew we were right on the edge of something very, very important, because they were just beginning this whole concept. They hadn't any previous building at all. They taught out of some ramshackle buildings down at the University of Pennsylvania. We were doing their first building. We did, I think it was, five or six after that.

JP:How big was the office when you started the Wright Brothers project? How many people did you have in the office when you started the Wright Brothers project?

EM:Oh. I think the first count was two. And then we hired a girl who could do everything. Do the accounts, answer the phone, be a draftsman, and she was an architect. She was a young architect student who Giurgola was teaching, so she came on. We built up, I think we had about five that were on the job, to do the job. Maybe it was more than that, but not more than seven. I used to borrow people from various firms that I knew of that did various

good work. Specifications, for instance, although I wrote the specs for it (the Wright Brothers Memorial Visitor Center).

JP:Oh, is that right?

EM:Yeah.

JP:Terrific. We'll get into that in a few minutes. Anything else about... Jon, anything else you have about the early earlier time?

JB:Well, I guess when you were saying that Romaldo Giurgola... You know, at the time that you two got together was when you kind of really discovered what architecture was all about. I assume that you two had a very strong design relationship together. It's obvious you did. I was wondering what you each think you brought into the relationship.

EM:What?

JB:What do you think you each brought, whether it was the design or whether it was the firm...

EM:Well, somebody once characterized our firm as the poet and the pragmatist. And that about says it all. We thought it was the concept, genius architect designer, that I was, well I like to think of as the enabler. I enabled all this to happen. I made this come true.

JB:You had had a great deal of experience by that time working in London at a young age.

EM:Yeah. Yeah. Oh yes, I did. I had a world of experience. I felt at ease. In other words, I knew what to do to get things done. But as far as the design aspect is concerned, Aldo and I worked constantly together on developing his concepts. I would criticize and bring ideas of my own into the mainstream of his thinking. It was not a situation where he would design something and give it to me, and I would take it. It wasn't that way at all. We worked closely together through out the whole time of our practice, which I thought was extremely valuable to me because I learned so much from him. I never stopped learning from him.

JP:Probably it worked both ways.

EM:Oh. I think so. Well, what happened when we got started, back to what you said, Jack, he said, 'Well, we'll try a project'. So it turns out, Bill Cabot, he had the project, and that's how we got started. But he called me over to his house that Sunday. I came back Monday. Emptied out my drawers at the firm where I was working. We've got an extra room in another firm that I knew of on Rittenhouse Square that had an extra room. They did not know what to do with it. I didn't know what to do with it. We rented that, and we got started there. But the Park Service was the beginning, and they sustained us for some time. We had a couple of jobs after that.

JP:I'm interested in how you selected the team to work on the project, particularly structural and MEP (mechanical, electrical and plumbing engineering).

EM:Well, structurally I worked with the engineers that I had worked with in my previous offices. There was one guy in particular, I had a lot of confidence in. That's what I was interested in. Being confident the guy could design

it and do it. We didn't need, I didn't think we needed an August Commondunt, the famous engineer. And this guy, his name was Joe Schultz. He did a sterling job. Magnificent. And then on the thin dome that we did, shell dome for the building, that is a Salvadori structural concept. I'm not sure whether you know.

JP:Well, Salvadori wrote the text books I learned structures on.

EM:Yeah well, he, he consulted with us. He designed that dome, and what's unique about it is his system. See, that dome had four sides, so the reinforcing goes from one side to the other and the other side goes that way. It's not a...

JP:It's not circular.

EM: No. It's not circular at all.

JP:Is that the steel work going out?

JB: Yeah, it's a photograph with the, uh...

EM:What's this?

JB:That's a photograph of the construction period of the dome.

EM:I don't see anything. I don't see it.

JB:It may be a little, may be a dark copy.

EM:I don't see. Yeah. Where's the dome?

JP:Well, those are the windows that they framed in and they are starting to place the steel around in using that window structure as... they used it as support for the...

EM: This is inside.

JB:That's an old picture taken from outside when they were...

EM:That's outside?

JP:During construction.

EM:Yeah. I see now.

JP:I have never read anything that identified Salvadori as being involved in... that's great. And where was his office? In New York?

EM:In New York. Oh, yeah. He was with Paul Weilinger, great big firm over there. And he was a friend of Giurgola. And he did this. That is why the domed area, the building has two columns right next to one another, because those two columns are supporting a beam because it crossed the 40 feet, which takes all this reinforcing that's coming down for the dome. And what we did was set it up as four separate beams around this...

JP:Periphery.

EM:Yeah. And that's how that happened. We had the two columns at each corner, because each one has a beam supporting that, supporting the reinforcing coming down.

JP:What about mechanical? Is that the same that was someone you'd know?

EM:Oh yeah. Yeah, that's it. I went to a chap here in Philadelphia by the name of Fred Schwartz. I think that was his name. I forget.

JP:You mentioned Schwartz. Was Schwartz the structural engineer? Fred Schwartz of Borton, Pennsylvania is who is identified here, but I didn't find the name of the structural engineer.

EM: What?

JP:I say that in this write up, Fred Schwartz was identified as the mechanical engineer. But I didn't see the name of the structural engineer in here, and I was trying to remember who you said that was. The structural engineer? That's alright.

EM:It was Schultz and Padlasky, was the name of the company.

JP:Okay. But the mechanical system, which is something we thought about what we're dealing with now, or will be dealing with is a particular interest. I'm interested in the concept of how the operable windows in the mechanical system were thought to work together to make the building functional from a climate control standpoint. Do you remember anything about that?

EM:You know that that was a heat pump. That was the first heat pump on the East Coast of the United States. I think it's long since been abandoned from what I've heard.

JP:I think it's been supplemented. I don't think it's been abandoned. I think it's been supplemented.

EM:Oh. Somebody told me it was abandoned.

JP:I was surprised they were still using it, because it's been so affected the weather and all. Because particularly those units that are on the exterior. But I think it's still, they told me it's still operable.

EM:I didn't know that.

JP: But I think for whatever the Park Service's idea of climate control was, if the record suggests that soon after the building was finished, they started monkeying around with it. A couple years after the building was finished in 1962, they actually started working on trying to modify that system, that I gather they felt they didn't have enough cooling or didn't have enough heat or something in the building to accommodate somebody's comfort. I'm not completely sure whose, whether staff or visitors or…

EM:Somebody wrote to me to pretty good about that. I forget who it was. I think it was when I visited in the 90's down there. They said, 'Oh, that mechanical [grumble noises]'.

JP:You know, you put a heat pump with all that glass, it's probably a challenge to start with, because they're really less capable than other systems. But it's interesting to know, and John, I don't know whether you knew this, but I didn't know it was the first heat pump on the east coast.

JB:Well I remember…

EM:That's what I was told.

JB:Was there something that had to do with the use of sea water?

EM:What?

JB:The use of the nearby seawater?

EM:Yeah.

JB:That was related to the system? I thought there was some...

JP:I saw a reference to that, but I didn't understand what that meant. I mean, I wouldn't think the salt water would be a salt water system associated with that.

EM:I think the sea water had it's effect on the temperature.

JP:Just cooling the climate in general?

EM:Yeah.

JP:Huh. That's something I didn't quite understand.

EM:Listen, all those pipes are buried out there in that sand.

JP:So, we have the mechanical. We have the structural. And so all the rest of the structure was done by your fellow here. The structural engineer you had here.

EM:Yes.

JP:And (Mario) Salvadori just did the dome itself.

EM:Yes. Yes.

JP:The other area that I'm interested in is how you all worked with the Park Service, because it seems from the record that I've read that there were a lot of decisions being made about the siding of the building, about the entry road, and at the end there were people coming in and talking about colors and furniture. How was the team... it appears integrated with the Park Service team, or not as the case may be.

EM:Well, Jack, it was really not very well integrated as far as the architects were concerned, because they had these small little bastions of disciplines, and each one of them had their territorial imperative in the design service, and they had to make their mark so that... I know there's a woman down there in the interiors, flying around about the paint. And she had us paint the outside steel frames orange. There's no way I wanted that, but I couldn't get that through at all. Sorry, Mr. Mitchell, blah, you know.

JP:What did you want?

EM: I wanted it to be a blue steel. And I wanted the flat part where it meets with the building to be black. So it would have this black outline that mimicked a small blue rim, a frame. But anyway, it doesn't matter.

JB:This was Anne Massey. Anne Massey, I believe, was the name of the woman.

EM:What was her name?

JB:Anne Massey.

EM:Matthew?

JP:Massey.

JB:Massey. M- A- S- S- E- Y.

EM: Oh, Massey. I don't remember.

JB:But those decisions were made by the Park Service or by people at the Park Service?

EM:Yeah. Yeah.

JP:Did that include the interior colors as well? The blue and the up above the ceiling grid. I don't know if you remember that, but that painted a dark blue.

EM:I think that it did. I don't remember, Jack, us being involved interior design elements at all.

JP:But the interesting thing is that you were involved in designing the pieces of furniture. For instance, that entry desk...

EM:Oh yeah.

JP:Um, so there was some. I mean, you all took it further than just the shell.

EM:Well, we may have made some suggestions about those colors inside, but we had very little to say against anything Anne Massey wanted us to do. But we had this desk in the front there.

JP:One of the reasons that seemed, that whole issue of the connection with the Park Service seemed so important to me is that one of the things about the building that seems special is that the design of the building, really from the time you enter off the highway, you have captured the visitor, and you have... With the fences on the site and with the planning that there, and the way the building was designed, the person was captured and their attention brought through and they were indoctrinated...

EM:Given itinerary.

JP:...Before they experienced what was just an open piece of ground that you had to be able to visualize.

EM:That's exactly the whole story.

JP:Of course, that's an issue now as the Park Service revisits what the next generation of interpretation will be, I don't know that that had been as broadly understood.

EM:That's exactly, Jack, that's exactly what we thought about. And the idea was to make it square and carve up a square into these various elements. One would be the entrance, and that fence that came along the entrance was to keep the itinerary aimed at the building, go through the building, then you come out on the other side of that fence. That was the whole idea. You got it precisely.

JP:And you know that the fact that they built the road, and I'm assuming built the road away from the earlier monument, so that even when you enter the site, you're entering it obliquely to the flight line, and you're entering almost with the monument to your back, which also

helped to keep the visitor's attention away from trying to figure out all this stuff until they got to the Visitor's Center. And...

EM:Well, I can't comment on that part of it so much. I mean, I don't know about the road and that parking. That was all done prior to our coming, really, on the site. I mean, it was all laid out by landscape people. Here's the site. And this site is here because they wanted primarily to have the visitor very close to the flight line so that they can the see the flight line from the exhibition room, which is where the airplane is, and then look to the left and see the thing up on that dune, the wing, the granite wing that is the commemoration of that that they put in.

JP:Well, for whatever connectedness or disjointedness, it does seem that those sets of decisions, and not necessarily getting into the interiors part of it, certainly the sighting and the entry fit with your goal and itinerary before you got out to the sight.

EM:Oh yeah. Absolutely. We established the, well, The Park Service had something in mind by putting the parking the way they did. But after we got the building going, we put the fence there.

JP:Mmm hmm, I was interested in that.

EM:We made the elements of the building work the way they do just so we could set up an itinerary of visit. And then at the end, you could go out of the exhibit room onto the terrace and then walk out to the flight line or out to the buildings. That was absolutely the way we saw it.

JP:Well, how was the size of the building established. I guess, a question I have is why was the dome 40 feet rather than 30 feet or 50 feet.

EM:What?

JP:I say in terms of the size, I'm curious why the dome was 40 feet rather than 50 feet or, uh, how the overall size of the building was established, and that you were putting this itinerary into it.

EM:I think that 40 feet is a product of our own doing. We were, Aldo was making these spaces to compliment each other. As you recall the floor plan, there's a spine of things that you come in at one end in, and then you go down through the museum. Then you come back and go out, and the platform it sits on is organized to hold everything within it. But the size is related to need.

JP:I guess the flyer was a known size so you knew had to accommodate. I assume you knew you were going to put the model of the flyer in the room.

EM:Oh yeah. Oh yeah.

JP:So that may have been some thing.

EM:That was a determinate to begin with, yes. Very much so. I don't remember exactly how dimensionally all these things came about, but I do know that it was a very simple plan in that the entry platform that you come up on the concrete, there's that figured wall of concrete

there. That was the end of the office accommodations. They were about the same width as the…

JP:As the gallery and lobby.

EM:…As the lobby and museum. Then there was the big square that was organized from what was the space that was left over on the square below.

JP:Can you talk about how the design of that sculptural wall came about?

EM:That was intuitive Giurgola- ese. He did that entirely. He often talked to me about doing a thing like that. So here it is. We just did it.

JP:So that's something he had in mind that he would like to do somewhere before that. Is that what you're saying?

EM:What?

JP:I say, it was in his mind before this project that sometime along the way he'd like to do something like to do something like that.

EM:Oh yeah. And when he came along, it wasn't in the design program, but it's there. We just stuck it in.

JP:It was an exchange for the colored window frames.

EM:[laughs]

JB:Did his design for it evolve? Did it kind of change throughout? I mean, was it the same one that was from the construction drawings or did it…

EM:What? What?

JB:The design. The design for the wall.

EM:For the figured wall?

JB:Mmm hmm.

EM:There was [TAPE ENDS. NEW SIDE BEGINS]

JB:Right, right. I guess that's why I was asking.

EM:We had a strange construction relationship because the contractor they got after the bidding exercise, because this was an all concrete job, was a sewer contractor. And he didn't know too much about building buildings. And I remember, he was telling Ted Bolan, the superintendent then from the Park Service, 'Well', he said, 'We don't do things that way down here. It ain't that way'. [laughs].

JP:This dome must have set him free when he had the experience of doing that.

EM:So, the first time I went down on the site, they had asked me to come down, we found that at least 20% of all the concrete he had poured, we had to take down. It was out of skew, out of plum, it was out of everything. So it was buried right there on the site. And he had to do it over again. And it was awful. And then I

went down one time. They had taken the form work off of those columns that support the beam.

JP:Under the dome.

EM:The columns were possibly passable, but there was one of them that was perfect. Absolutely perfect. It's corners were just as sharp as they could be. So I asked the superintendent then, I said, 'How'd you get this one'. He said, 'That son of a bitch? I tell you it (the form) started coming apart. Then we just kept on hammering it back, back together again'. What they did was vibrate it very well. [inaudible laughter and words]. Back together. Then when the bush hammering came around, that was a concept nobody down there had ever heard of. So, it was up to me to show them what to do, and how to do it. They had several bush hammers there. And I showed them how, you know, you take it easy and you just work that first layer off. That's all you're trying to do. And that's the only way you can follow a line, a straight line, is to do it precisely. And I was showing them how to do this, and then, this black guy came over and he said, 'Here, gimme that thing'. And I gave it to him, and he said, 'I'll show you what to do'. He banged through the wall with his hammer and it took off in the next county. He didn't know what the hell he was doing. That was so funny. 'This is the way with a hammer. Boom!'

JP:Threw it out of his hand.

EM:Yeah. It just ricocheted back, far away. But that construction activity was very strange, in that you were working with a sewer contractor and all the laborers were being bounced from around the area everywhere. It was very difficult, I thought. And they had, the Park Service had a fellow down there by the name of Jed Ball, who was the Park Service representative on site. He was there all that time. He was a wonderful guy. He tried so hard to get these guys to do a first rate job. And I think what they got done was way over the head of those people down there. They had no idea they could... The biggest problem was in my mind that counter overhang that made the grout up at windows on each side, you know. We countered the dome...

JP:Why was that that the biggest problem?

EM:I thought it was.

JP:Why?

EM:Because of the reinforcing and forming, I think, that getting it exactly right at the ends and down that miter that brings it back down to the corner where these come in. I thought that was the most difficult thing that was going to be on the job. I don't know that it was, but I felt it was.

JP:Can we talk about this, this is an area of particular concern I have of what we're dealing with just right now. And what it looks like, what we have found is what appear to be the feet of the chairs for the steel that have, because of their closeness to the outside surface, have rusted and spawled a little of the concrete away. It makes sense in my mind that, uh, that one, there would be chairs to keep the steel in the right position. And secondly, that the feet of those chairs would by nature have to sit on the forms, which means that we're going

to be close to the edge of the concrete. So what we have are areas where there might be the size of half that bookshelf (3'x5') that are these little rust marks of the feet of the chair.

EM:Oh yeah?

JP:So we're dealing with that and we're probably sort of drilling them back and getting them back further into the concrete and then doing a patch. But they're also, and I don't know how this all evolved and this is another issue, we found what looks like a parged coating over that whole projected eve condition.

EM:Oh yeah? I didn't know that.

JP:Well, you see, we don't know whether it was original or whether it was later added.

EM:It was later on. Yeah. I don't know. I don't think it was original, but it might have been. I don't think so.

JP:You see, if those are in fact the chair feet that we're seeing popping through...

EM:Oh, they are?

JP:...Then how particularly a sewer contractor could get a good enough finish to cover those up originally. Maybe originally they weren't as noticeable or, you know, when it was enough of a something that could go over them initially, which is not...

EM:They're not in the wall, right.

JP:Pardon me?

EM:They're not in the wall unit, talking about a wall, are you?

JP:Well, can you see this area here? (JP shows elevation from original construction documents and points out arched eave at dome windows)

EM:Yeah.

JP:That's where they are. I mean, it's in various places, but that's the location. They're in that curve.

EM:Isn't there something on that concrete?

JP:There's a parge coating now.

EM:There should be something, like an asbestos sound.

JP:Oh no, this is on the... I'm sorry. I'm sorry. This is not right. You're right. They've taken the asbestos, so I'm talking about on the exterior. I'm talking about where that exterior part. You're right. I was pointing on the inside, and it's on the outside. That's where we're finding that. And that's where that parge coating...

EM:I didn't know about that.

JP:So you didn't have a parge coating in the original or didn't find on the site that you needed to do that when they pulled the forms away.

EM:No. No. I don't think that they did that.

JP:Well then, we're dealing with that. And I think we're going to have to leave the parge coating there, because the amount of concrete between the chair feet and the outside, given the amount of freeze- thaw they do have in that environment, and the amount of spalling that we're getting from it, we're probably going to have to keep the parge coating on it.

EM:Yeah.

JP:Because I agree we'd probably do more damage getting it off than keeping it on there.

EM:Yeah, probably so. Probably so.

JP:So anyway, that was one of the things I was particularly interested in understanding from you.

EM:Well, I didn't know about that.

JP:But your memory of that exterior eyebrow was that when the forms came off, it was a nice consistent finish.

EM:It was done. Yeah.

JP:Okay. Well that's helpful. Jon, what else do you have in that?

JB:Umm, I think we covered the material questions.

JP:Let me ask a few more. One about the sky lights. Do you remember the sky lights? They were in the bathrooms. And they were shown to be glass block skylights.

EM:Glass block skylights. In the wall?

JP:No, they were in the ceiling. They were to bring natural light into the bathrooms. You know, the bathrooms are right behind that sculptural wall, and in the same bay as the offices.

EM:Yeah.

JP:And there were four. Two in the women's and two in the men's. And of course, they've been replaced over the years. We're going back with glass block. We just don't have a lot of information on... You did have a detail in the drawing, and we're working with that detail, but the specifics about the glass block that some of the older people at the Park Service on the island don't remember ever seeing glass block.

EM:I don't either.

JP:Okay.

EM:Was that on our drawings, Jack?

JP:Mmm hmm. Yeah. Well, that's alright.

EM:That got by me.

JP:A lot of water under the bridge.

EM:That got by me.

JP:And let me ask you about the glass. One of the things that early photos of the buildings illustrates is how transparent that building was. You know, how when you were on the outside, you looked straight in. I mean, it was clear, looked like clear glass, you know, there was a

real connection between the outside and the inside that's been lost. Now it's got tinted glass on it.

EM:It's what?

JP:It's tinted glass, because of wanting to reduce the sunload, but what you've lost with the tinted glass is this transparency creating the connection both from the outside and from the inside.

EM:Yeah, well that was the specific design objective to do that.

JP:Okay. What we're doing is we're going to go back, we're going to replace the non- original windows. We're now doing the windows up at the clear story. We're doing those with clear glass out of stainless steel. Same detail (as in the original drawings). We're taking the same drawings. We've modified them only in depth to accommodate an insulated glass in, and we now have to use impact- resistant glass to be up to code, but that also will give us UV protection. So we're going to end with a clear glass, same profile out of stainless steel, and unfortunately or fortunately, they'll be orange.

EM:What's that?

JP:The windows will be orange again.

EM:Oh. The windows will be orange. What windows?

JP:The frames. The window frames.

EM: The round?

JP:All of them.

EM: Oh, no.

JP:[laughs]

EM:What the hell for?

JB:It was the historic condition we're after.

EM:You tell Anne Massey to keep her fingers out of this. Why is it going to be orange? Is it because you're restoring an old building.

JB:That's right.

JP:That's exactly right.

EM: Oh, shit.

JP:[laughs].

JB:And we honestly, you know, this is actually, I have never heard this before, about what your desires for the window frame may have been. Actually, we had always basically thought that it was one of your specifications to have those frames orange.

EM:No, no. No way. She's (Anne Massey) laying it down that they were going to be orange. I raised hell about that.

JP:Did you ever identify specifically the blue that you thought they (the window frames) ought to be?

EM:No.

JB:[Gesturing] Do I understand that you wanted this side to be black and this to be blue? The inside?

EM:No. If you recall that detail...

JP:I've got the drawings here.

EM:...There is a, through the entrances maybe, a flat steel that goes up before the second comes out.

JB:Okay. So, there's two. There's this and then there's that.

EM:Yeah.

JB:Yeah, so there are two flat.

EM:Yeah, it's the back one that's black.

JP:Ah, the back window's black and the front one is blue. So, they were angles. What they were were angles, right? Weren't you using angles on those windows, as I recall.

EM:No. It was a...

JP:Well, it was an assembly. Yeah. But they had to effective...

EM:Holland Metal Work.

JB:So that and that. So this would have been black and that would have been blue.

EM:It was like this, I'll show you. That drawing here. This is the section. This was... This frame went around, all the way around. And then the

Image of discussed window detail.

concrete was right there. All the way around this top and bottom sides was this flat piece right here.

JB:Right.

EM:That's what I wanted black.

JB:Right.

EM:And I wanted this blue.

JP:The base of it was blue? And this plain here, that was blue?

EM:Yeah.

JP:And that was blue?

EM:Yeah.

JP:Okay.

JB:So just the reveal was black.

EM:That's right. That's right exactly. That was all I wanted to do was to make that window frame identify itself as not a part, not the building.

JP:That it was floating in that opening.

EM:Absolutely. Yeah.

JP:Okay. We'll have to smoke that one over.

EM:I would definitely say don't paint it orange, because of historic renovation or whatever you call it, because none of us wanted it that orange. That was forced on us by Anne Massey.

JP:We'll work that problem a little bit.

EM:Okay.

JB:It's good to hear it now.

JP:Yeah.

JB:It's good to hear this.

JP:What would be interesting would be to identify the blue that you thought would have been appropriate.

EM:Think of a gun metal blue.

JP:Okay. Great. We can do that.

EM:It's not a light blue. Not a blue that you could tell right off that it's blue. You have to see it, stumble across it.

JP:Alright, great. Terrific. Let's talk about lights in the flight room under the dome. The custom lights under the dome.

EM:Yeah.

JP:Now those lights were painted blue originally. Was that Anne Massey?

EM:I don't think so. It might have been, but I doubt it. I don't think. I think that's a Giurgola. I think so.

JP:Do you remember those lights?

EM:Yeah. I sure do.

JP:Now they were made out of angles and sheet metal.

EM:Yeah. I remember that. Somewhere in there, there's been some painting on the concrete. I forget what that is, but it shouldn't be there.

JP:Well you know, one of the things they did with the air conditioning is they furred down under the ribbed concrete. They furred down and brought ducts around, and painted it yellow. A bright yellow. That's probably what you're referring to.

EM:Yeah.

JP:Ultimately, I think that's got to come out, and I think how the systems work, it comes back to this mechanical system issue, because for meeting what their (the NPS) current expectations are, we've got to come up with a way to deal with those, with delivering air within the spaces where you originally provided to deliver air. And you do have to meet some new standard of air delivery.

EM:It's not going to do that.

JP:Well, I don't know. We ain't got to that. We have not crossed that bridge yet.

EM:Oh.

JP:Umm, let's see. I guess the issue... Let me ask you, in terms of climate control, the building had drapes in it originally. Was that something you all incorporated, or was that an Anne Massey?

EM:That's an Anne Massey.

JP:Okay. So, you envisioned the building to all be open and clear and transparent connection.

EM:Yeah.

JP:Okay.

JB:Anne Massey's becoming a scapegoat for all things, and we don't know exactly if she did...

EM:[laughs] Anne Massey. We're making her a scapegoat. You're right. That's right.

JB:So this recording is going to be interesting.

EM:That's right. We'll say that for the recording. I agree with that.

JP:Exhibit design. The exhibit panels appear to be integrated into the design of the space. You know, there's that curved cypress wall that was separating the lobby from the museum. And then you had these, again going to back to the angle, brackets that the exhibit panel is mounted to. Is that something you all did? And did you work with the exhibit designers?

EM:Yeah.

JP:Were the exhibit designers Park Service people? Or was there an exhibit designer.

EM:No. There was an exhibit designer firm. I thought they were from a long way away. Los Angeles or something. I don't remember that firm at all much. I mean, I just know we wanted to integrate that particular museum into some building so there could be a sense of it just wasn't something all that clumped in. That had a, had a part of the building. That's what was behind our design. One thing I wanted to talk to you about, Jack, was the cypress panels on the outside. Has that cypress deteriorated?

JP:You know, honestly, I don't think so. But I'll have to tell you I haven't seen much of it. I, frankly, assumed all along that the reason they have done so much to the exterior of the building was that it had deteriorated. But the more I've been involved in it, the more I think it was a factor, what I'm understanding to be, the Park Service has been substantially understaffed and under- committed in the maintenance and upkeep area. And the things they did, like replacing the windows... When they

replace the windows with the Kawneer Window System, I think it's just for maintenance, because when the paint faded on the window system rather than repaint it, they said, 'Heck, let's just put in aluminum, anodize it, and we'll never have to fool with it again'. And the same thing I think happened with the cypress panels. When they started needing a little maintenance, they thought they needed maintenance, they may not have even needed maintenance, when it weathered they thought, "Gee, this must need to be spruced up some way' rather than just accepting them as nice weather panels.

EM:Oh, I saw that. I was amazed, because I was under the impression from the cypress people, I have a letter from them that I got way back in early days of design asking them to tell me what cypress I should use for this, and what to finish it with, and what all this. The answer came back, 'Don't finish it. It'll be fine. It'll be. It's the kind of tough that they make ship decks out of.

JP:I think it weathered. I think it did its natural weather, and the Park Service maintenance people, who you know for all they've got to cover, aren't particularly trained or knowledgeable about cypress thought, 'Gee, this looks weathered. It's a maintenance hassle and these aluminum siding panels came along', and they said, 'You know, we can do this and never have to maintain it'. So I'm expecting that what we'll find under that aluminum stuff is good (cypress) panels. They have some holes in it. If we can keep it, my goals would be to keep it. But I think we're going to find the cypress in pretty good shape.

EM:Well, that's what I personally would expect, because I was told this stuff doesn't deteriorate. It's, it's, it's the best kind of cypress you can get. In those days you could get it out of nowhere. You can't get it anymore. In those days it was the best you could get.

JB:Well, from the few examples, the few pieces I saw behind the new paneling, it looked fine. It really did. But as Jack is saying, there are many times that Park Service maintenance tend to do things that they think are proactive. They think they are avoiding future problems, and I think this was one of them, where they just went ahead and did it.

EM:One other thing I think of is out, as you go in the building. To the left on the outside where you have the end of the entry area. Then you have three or four boards that are sitting on their edge right along the edge of the concrete.

JB:For the bench?

EM:That's not a bench. That was never meant to be a bench, but that was there to keep people from walking off the concrete.

JB:So it was a barrier?

EM:What?

JB:It was kind of a barrier?

EM:Yeah. Just an indication of a barrier. It was not a railing. But I noticed that when I was there that somebody had nailed down on top of it pieces of plywood. So that when you got done, they fastened it down, it was like a seat.

Well, they could but that ain't the way to do it. If you want it as a seat, you have to do some more to it than that.

JP:See, I don't think anybody ever knew that. That's the first I've ever known. I mean, I saw the drawings and I understood the construction of it. But I had, because of its width, I had assumed it was a seat. But you'll be interested to know that an early drawing, I mean, an early photo that must have been soon after the building (was completed), you would have lost your mind if you'd have seen this. They had covered it in plywood and painted it orange to match the windows.

EM:Oh my god.

JP:It was a very early photo.

JB:It looked like this levitating, it was kind of like this levitating orange slab that ran across the whole length.

JP:But it was gone, and again, that's the kind of thing that's very helpful to know that, because that's the kind of thing that be straightened out in this next go around.

EM:Well that wood was either cypress or teak wood. And it never ever needed any paint or any finish at all.

JB:Now did you consider that the same way in terms of the path through the building that that was kind of just a marker, you know, as you were saying to keep people from going down.

EM:Yeah. Yeah.

JB:But instead to maintain a certain procession through the building. So it's kind of like a curb almost to keep...

EM:Well it was the edge of the concrete platform and the end of this building, or the start of the building. It was about, oh, what about 30 inches or more. I don't know. It was something more than that.

JP:But the width of the...

EM:The width of the end of the concrete platform and the beginning of the office wall, I mean, entry way wall. I've forgotten what the width is, but it isn't very wide. But it is a way somebody could go back and forth.

JB:Right.

JP:Well, that's very interesting and helpful to know. It's less than four feet.

EM:Huh?

JP:It's less than four feet.

EM:Four feet?

JP:Less than, less than that. Clear through that.

EM:Can you see it on the drawings there?

JP:Yes, they're a little hard to read, but um, you can, they're just so small, and the copies we have aren't very good. But this is the bench right here.

EM:There it is. Yeah.

JP:Yeah. And then over here, see there's the detail. The writing is, I have a drawing I can read this on, but this version I just can't tell if it says teak or cypress. But there's your little base detail there.

EM:There we are. There's where I wanted black.

JP:Black. Yep. That's nice. Okay.

EM:Well, what else can I tell you?

JP:Well, um... Are we doing alright time- wise for you?

EM:What?

JP:You all are okay? Umm, let me see what else. I think that covers all the specific things that I was interested in. Umm, and you covered some of the... Anything else you got for that?

JB:No.

JP:What are the qualities from what you saw in '95, what are the qualities that you would most like to see recaptured when the building is restored?

EM:I was most offended by the aluminum windows and doors throughout. I was completely offended by that design. It looked just as, you said it's a Kawneer. Or it's somebody's...

JP:It was Kawneer.

EM:Oh, was it? [laughs] Oh, god.

JP:So when you put the Kawneer windows and you put the aluminum, something romantically called shadow form, you know which is that aluminum siding stuff over the cypress things.

EM:What was that?

JB: He's talking about what was put over the cypress panels.

EM:Oh that flat sheet. They have ridges cut in.

JP:Well actually it was a way to fit these panels together. They were these vertical panels like vertical siding and they would fit in a groove, and that's what that groove was. That's how they assembled that system.

EM:Well I was talking about the board marks cut in the surface of this metal.

JB:Well, I think so it looked like the grain of wood.

EM:No. Not the grain. It was where the board, it joined with the other board. That's the way it looked to me.

JP:I think that's the joint. It came in pieces like that. And then when you joined them like that, it gave you a vertical line like a tongue and groove. It was like a tongue and groove. Where they, you'd ship out a package of 8 inch wide aluminum panels.

EM:But they weren't 8 inches wide.

JP:Pardon?

EM:What I'm getting at is what I saw was about 3 inches.

JP:No. I think they're a little wider than that.

EM:Anyway.

JP:Yeah. But that stuff has got to go.

EM:I was also incensed that they painted that concrete beam around the front of the exhibition hall. I couldn't believe, blew my mind. It was painted white when I saw it.

JP:You know what that is?

EM: No.

JP:Well, they came back and put one of these sprayed on roofs. You know the spray on roof material. It was kind of this cheap fix kind of approach to re- roofing. They came in and sprayed on that. And after you do that, the last thing is a coating that's white. And they just sprayed that stuff right up the wall. So that's one of the things we're doing in this phase of work. All that's coming off. We're stripping that all. It's going back to the concrete. But that was not paint. That was the spray from the roofing that somebody, I guess, just thought either for waterproofing or other reasons.

EM:I just couldn't imagine that.

JP:It was a mess.

JB:Well you know, but the other thing that he may be referring to on the interior is that they've since painted all the corners, the finished edges of the concrete, they've painted them brown. The bush hammered surface is still textured, but the two inch corner of all the concrete piers, they've painted those.

EM:Yeah. I didn't noticed that.

JP:You didn't anticipate those being painted, did you?

EM:No way.

JP:I didn't think so. Well, I'm glad to hear that. I'm glad to document that because that's something that needs to be...

EM:No way.

JP:Good. What other things? So we've got the white paint. We've got the windows and the siding.

EM:And the bench.

JP:The bench. Okay.

EM:That's just. The little bit of time I was looking at it, I saw this thing...

JP:One of the things that showed up...

EM:...Inside the exhibit all through, you know, I thought that was bad. And...

JP:You don't remember desiring to have any yellow inside the building?

EM:No.

JP:Okay. Are there colors that you specifically remember desiring to have inside the building?

EM:No, Jack. I can't remember. Except the blue. I think I remember the blue lines. But other than that there weren't any paint. I don't think there was any paint.

JP:Now, the building in the early photos show that there was acrylic tile, rubber tile in the building. That the flooring was a tile flooring, a rubber tile flooring.

EM:You mean in the entry way?

JP:Well, I think... Yes, in the entry way for sure, and I think it went, I know it went back into the offices, and I thought it went into the flight room as well.

EM:Yeah. I think it probably did. Yeah.

JP:Now there was the first introduction of carpet that I'm aware of, was a circular piece under the dome. Does that ring a bell? Did you? Okay.

JB:That the plane sat on.

JP:There was a gold, some kind of goldish piece of carpet that are in some of these photos.

JB:Right.

EM:I tell you, Jack, very frankly, on the flooring we were up against meeting the budget that when it came to finding a flooring, vinyl tile was coming in, but this rubber stuff was there. And it was easy going, and it was heavy duty stuff, so when... let's just pick that up. And we didn't sweat it with quarry tile floors and all that. None of that stuff. And I don't know whether we made the budget or not. I never told it was $260,000. I don't know if we made that or not, because actually, there wasn't much contact with our firm after it was being built. Not much at all. I was sent down there about 3 or 4 times at the most. And then when they took over, that was the end of the architects, that's all vigor.

JP:Except for when the windows turn out orange.

EM:I was dead. [laughs]. I knew that ahead of time, but it was a great, great project. I was just sick that they had such ill- advised moves. They made such ill- advised moves down there. It just seems to me like nobody had any sensitivity was there.

JP:Well, if it's any consolation, the building is now a national landmark.

EM:I know it is.

JP:And what that means is people are going to be paying attention to those things in the future, so while it's evolved through this bit of a rocky phase, it has survived to be a very important building.

EM:Yeah. I know it.

JP:And I'm interested in how you feel about that.

EM:I think it's absolutely magnificent that those people down there in the landmark, the thing they've taken on, that's great. Absolutely super. It's like somebody giving me the gold medal. Really. I think it is.

JP:Well, Jon had an interesting observation. Why don't you... about the Liberty Bell.

JB:Well, it was connected to how you feel about the Wright Brothers building becoming a national historical landmark. At the same time, I wondered how, where your feelings go about the Liberty Bell Pavilion, which unfortunately is about to be lost, and how you kind of weigh those two projects.

EM:I don't think they have any connection at all.

[BREAK IN DISCUSSION]

JP:The stone that was used on the dome.

EM:The stone?

JP:The stone. Do you remember the white stone?

EM:Oh yeah. That marble chips.

JP:How did you go about selecting the marble chips? How did you go about selecting that? I've actually found the original location, and I think we're going to be able to get chips out of the quarry that it originally came from.

EM:Oh yeah? Oh yeah?

JP:Yeah.

EM:Well I'll be damned. Well, one of things that I was concerned about is that those chips didn't stay. And I wondered whether that was a good idea to put them on.

JP:Uh huh.

EM:Would it have been better to have a...

JP:A smooth dome?

EM:...A slick, smooth surface on there.

JP:But it is what provided the white look though, wasn't it?

EM:Oh yeah.

JP:And did you have an alternative for a white finish on the dome?

EM:No.

JP:Is that what the objective was, to appear white?

EM:No. But it wasn't an objective. We knew it was going to happen when we used marble chips. We wanted to use marble chips, because it was dressier. It dressed the building better than slag or something else.

JP:Well right now, we're specifying putting it (the marble chips) back in, recognizing that it is an issue.

EM:Can you paste it down?

JP:Well, we're gonna paste it down. We're gonna set it, and put it into an asphalt layer on top of a modified bitmeer roof. The last layer will be an asphalt coating, and then the chips will be pushing down.

EM:That ought to hold it.

JP:Well I hope so. You know, it may get brittle with freeze/thaw activity.

EM:It probably will.

JP:But it's something, you know, again, that we have to deal with. But I was interested in your comments about that. Umm, anything else you have had on your mind that you would like to comment on about?

EM:Well, tell me, what are you going to do about the windows?

JP:We're going to replace the windows. We're taking the Kawneer (window system) out. Now first of all, we're only, for this phase, we only have funding for the upper, the exterior part of the dome, including the clerestory and the low roofs. But within that scope of work, we're really making a lot of decisions about what's going to happen down below, because we've got to go ahead and deal with the windows, and whatever we do with the clerestory, we'll do down below. So what we've done is taken your detail for the windows. And the only thing we've done is made it a little deeper, like 5/8th. [TAPE ENDS. NEW SIDE BEGINS]

JP:Future expansion of the Visitor's Center, and just asking Mitchell about the thoughts of his expansion. Go ahead.

EM:Well, we'd been faced with this idea for a number of years actually. We've known that the Park Service was running out of space. And very simply, what we thought up was an extension to the building out where the offices area is, out that way, and an auditorium possibly out the, what you might call the back of the museum area there. The auditorium out that way. But, those two would be additions that can be attached to the old building via a thumb- kind of a passageway. They shouldn't be smacked right up against it. Neither should the auditorium be that way. But it can exist there. I think, myself, that I don't know what to do about the airplane area where the main exhibit hall, I don't know what you'd do about that.

JP:My dilemma, and for me it's not really a dilemma, is that it goes back to this issue of the interpretive experience being totally integrated into the building design. It seems that if you'd work out a circulation pattern, that does all the things you need to do before you launch people out onto the site, that they can finish up where you intended for them to finish up, and that's looking across the plane in that flight room out onto the flight line. And that you keep that both as the final step of interpretation, interior to the whatever the expanded complex is, but also true to the original intent of the building itself, the original building itself.

EM:Yeah.

JP:And you just keep it the way it was, and you say, 'This is the final step'. Whatever modifications happen to the interpretive experience, that's a given. And that is that the last thing before going on the site is the visitor looks across the view of the glider and the plane out to the flight line. And all of a sudden, the images and the mental pictures are solidified in terms of being able to understand what the Wright Brothers did in physical terms. You see

the land. You see the planes. And then you're ready to go out and walk in more abstract, and see this flight line.

EM:That's the way we see it, Jack. That's exactly the way we see it.

JP:I have trouble feeling that there's a way to integrate this building with new space without keeping this building integral to the sequence of the visitor experience, so that the circulation has to start there and it's got to end there, and whatever adds onto it in between gets integrated into these additions or whatever. But you start there, and you end there.

EM:Well, all of the offices can come out and that space can be brought into the usable area. That's probably not enough.

JP:You know the reality, and you commented on it in the earlier interviews, this issue of the bookstore and the gift shop, and the reality is we've got to have a gift shop. And typically the gift shop is sort of the last thing before you go out or you know you capture the dollar at some strategic point, and it looks to me that the office space might be a place to, get that gift shop out of the lobby, clean all that back up, get the gift shop back over in that zone, and relieve some of that...

EM:I would think that would work, if you've got to have one.

JP:Right.

EM:Oh, I hate to think what those gifts would be. [laughs].

JB:Every type of paper airplane you could imagine.

EM:Well, I remember at the dedication of that building, the boy scouts in the area had made the Wright Brothers glider, a plastic model, you know the lighter plane model. They gave them to all kinds of people around there. I forget whether I got one or not. It doesn't matter, but it was so nice to see the little model about this big of that airplane.

JB:Now, have you ever been called upon to design an addition for one of your other buildings that the firm designed? Have you ever been in charge of an addition to one of the buildings before?

EM:That's a good question. I'm trying to think now if we ever have.

JP:Well, you've certainly done an addition to a historic building, because that's what the Wainwright building was.

EM:Well, yeah. That's exactly what it is. It's an addition to an existing building.

JP:But it wasn't necessarily what Jon's question was. Is that, was it an addition to one of your buildings?

EM:Yeah. I don't think so.

JB:What I guess I was trying to think about was, the comments you were making about the transition between the existing building and the new building, like how you were saying about that there should be some distance, some kind of gap between the... do you

understand? Between the new building and the existing building and the new building that there would be some kind of gap? Because they wouldn't be, as you said, smacked up against each other.

EM:Oh I see.

JB: I was just trying to think of that idea.

EM:Well I was thinking, I was trying to maintain that square of the existing as pristine, hold on to that. And turn over all the office space back into the museum, and use the flight room or the big exhibition hall, as less jumping off point, before you go out onto the terrace, and go on out to see the flight land or whatever you do. You have the interpretive experience that way. All the ancillary things that you now need or can use could be placed in strategic locations and hooked into the existing building in a sensitive way where you don't destroy the square on the ground. That stays there. But you can go into it through various means. That's what I would think of. Getting back to the Liberty Bell Pavilion, I wanted to say that we were very rigidly controlled by the Park Service here when that building was designed, because it had to be done, it had to be available to move the Liberty Bell into it on January 1st, 1976. No, it had to go in December 31st, 1975.

JP:Right.

EM:And when the Park Service contracted with us, it went... you've heard of the eleventh hour, haven't you? Well, they contracted with us at 11:59. [laughs].

JP:You know why they did that? It's because you delivered those drawings on December 7th. [laugh].

EM:But, I'm trying to describe a situation with a program was very rigidly set just a small little building that would collect people. That's what it does. And it had to be low and have a squat profile, because it's on the center line of that mall. And we had to have it ready so that the Liberty Bell could be put in it on December 31st, 1975. It all happened the night we moved the Liberty Bell, before midnight that night. CBS had all the television coverage and their wires were strung over everywhere, and there was a thunder storm the likes of which you ain't seen in a long time in this area. It came through and dumped a couple tons of water on us all right at the time we were moving the bell, and the cable started exploding and all this hot short- circuit explosion stuff was going off all over the place. And those were just some of the anecdotes connected with it. The fact that everybody is so down on that building is, is, is somewhat of a bit surprise to me. Because I think it's a very good building. I think it does exactly what the Park Service wanted us to do, and we tried to give it some quality by using the ground stainless steel and copper lead- coated roof. But I think it's a good little building myself. And I just don't understand what the local party line is, what the conventional wisdom is all about.

JB:Well, I think in addition to the building, I think that whole attitude or idea about the mall in Philadelphia has changed also.

EM:Oh yeah. Oh that's true.

JB:It's gone from being this big, long modern swoth...

EM:Oh, no doubt.

JB:And now they want to put cafés along the side. They really, I think it's a different idea about, you know, urban space, too, and I think that basically the Pavilion is also kind of a victim of the rest of the ideas.

EM:Oh, I think that the Liberty Bell Pavilion is obsolete in the present thinking, no doubt. I don't have any problem with that. I just get wound up when I hear everybody hating that building, when it's a good little building. But the new idea seems to be okay to me. I don't see anything wrong. It's going to be a nice new structure modernized. That'll be good, I think.

JB:Right. Right.

EM:I have no problem with that. I knew that that was coming anyway, because there again, the Park Service never had any idea that the visitation to the Bell was going to be like it is today. It had to have a different setting, and they wanted to get it out of the center line track. Well, what can we do about that? Nothing. We were told to put it there in the beginning by the Park Service. Anyway, it'll work out okay. I'm sure.

JP:Any others thoughts you had about the Wright Brothers building in relation to other work you all did or how that... what its standing is in relation to the rest of the work and all the great projects that your firm did, um.

EM:Well, the Wright Brothers was in our career, the keystone of the beginning. It was the one that gave us the opportunity to balance within the structure of making a building all the economic factors and come out at the other end with a structure or building that really performed very well for quite a long time. And we looked at it as a very high quality enterprise for us, the professional end of doing that project was a very satisfying one. And the experience of having that relationship with the Park Service and the various government agencies involved was such that we could extract from that experience a way to deal with some other client. It was very helpful. I know that when we were prospecting to get the next job, we went to an interview and all we had were the Park Service drawings and the sketches that we had made for the schematic design. That's all we had. We showed them that and after the presentation was all over, we got the job, and it was for the American College of Life Underwriters. I was telling you about that. It was coming in on the ground floor of a whole new program for this college, and one of the fellows said to me later, he said, 'You know, did you ever think about how you got that job'. I said, 'No. I never wanted to think about that'. [laughs]. 'Well, I'll tell you... when we saw you put up all those drawings from the Park Service, we figured if they hired you guys, you gotta be alright, so let's go'.

JP:That's great.

EM:I thought that was good. The quality of the drawings didn't matter. It was the Park Service.

JP:Well, this has been wonderful, thank you very much.

EM:I don't know that it has, Jack.

JP:Well, I'm telling you. It has. [TAPE ENDS]

Feature Inventory

This inventory was prepared using a number of documents provided by the Southeast Regional Office of the National Park service that included original construction documents for the building, photographs, both historic and current, correspondence and previous reports on the site and building, its significance and condition. A visit to the site was made by the principal investigator, Jack Pyburn, AIA, on March 30- 31, 2000. The site visit included visual identification of the building and site features and an assessment of their condition. Existing features were investigated to determine whether or not they contribute to the historic character of the building and site.

All cost estimate data is represented in 2000 dollars.

FEATURE INVENTORY: EXTERIOR

All Estimable Items

Materials:	$52,310.00	Labor:	$85,542.00	Total =	$137,852.00

EXTERIOR	3373	Ornamental Fence	Steel/Wood

Feature Description: Alternating vertical wood slat fence. Steel posts and connections, 2"x 3" wood strips vertical, 2"x 6" top and bottom rail, two 2"x 2" intermediate horizontal rails to which vertical strips were attached. Intended for a visual barrier to and from flight path and screen from employee parking and office area. Posts are set in concrete footing. Horizontal wood support members are attached to steel post by steel clips.

Feature Notes: Parking lot section of original fence exists. Flight path screen has been removed. Additional fence at parking lot (east side) is not original.

Feature Condition: Poor

Total Inventory: 46 LF Parking Lot Screen, 98 LF Flight Path Screen (no longer exists)

Historic Rating: H

Priority: Critical

Deficiency: Steel posts are substantially corroded and pitted due to exposure to the elements. Existing wood on remaining original section of fence may not be original but dimensions appear to be faithful to dimensions on original drawings. Wood to wood mechanical attachments appear to be new and either stainless or galvanized.

Recommendation: Replace original fence at two locations shown on original site plan to match details in original drawings.

Materials:	$4,070.00	Labor:	$1,804.00	Quantity:	Total =	$5,874.00

EXTERIOR	3390	Landscape Structure: Bench	Wood/Concrete

Feature Description: 2'x6' wood member set on end and spaced 1 1/2' (width of 2x spacing member) forming bench. Bench seat set on concrete base with concave profile @ 8' on center. Bench located at south edge of building pedestal.

Feature Notes: The bench bases appear to be original. However, the wood framing and bench seat is clearly not original and does not reflect the slat detail of the original drawings. Photos were observed that showed people sitting on the slat bench. Another early photo indicated a material finished in the red/orange color of the original window frames covering the wood slats. This sheet material is not indicated in the original drawings. It may be that as a result of visitor comments and complaints, the sheet material was added to the bench for visitor comfort. However, it has since been removed.

Feature Condition: Good **Total Inventory:** 52 LF

Historic Rating: H (bases)
N (bench)

Priority: Historical (benches)
Serious (bases)

Deficiency: The wood bench is not original. The cove bases appear to be original.

Recommendation: Reconstruct bench to match original design and detail. Restore concrete bases.

Materials: $2,040.00 **Labor:** $1,138.00 **Quantity:** **Total =** **$3,178.00**

EXTERIOR	3390	Landscape Struct: Planters on Terrace	Cast Concrete

Feature Deseription: Approximately 5.5.1'6" cast concrete planters (do not exist). The planters were positioned on the east and north upper levels of the ceremonial terrace.

Feature Notes: These planters no longer exist. They have been observed in 1960 photos though they are not indicated on the drawings.

Feature Condition: missing **Total Inventory:** 4 EA visible in 1960 photo

Historic Rating: H **Priority:** Historical

Deficiency: These features have been removed and no longer exist.

Recommendation: Consider further the appropriateness of these features to determine if they should be reconstructed. If deemed appropriate and significant in overall restoration concept, reconstruct planters on north and east sides of the ceremonial terrace as indicated in early photos.

Materials: $200.00 **Labor:** $600.00 **Quantity:** **Total =** **$800.00**

EXTERIOR	3390	Landscape Struct: Entrance Terrace	Exposed Aggregate Concrete

Feature Description: The paving surface of the entrance plaza is a square grid of exposed concrete in 4' x 4' units offset one half unit in each row. The square exposed aggregate units are edged with a 9" band of exposed fine aggregate cast in place concrete on the east and south sides of the terrace.

Feature Notes: The square cast in place concrete units of exposed coarse aggregate are original but are showing significant deterioration from freeze thaw cycles and use. This is evidenced by the loss of concrete binder between the large aggregate. While the wear observed in the square units is varied, the wear is sufficiently pervasive that the restoration and/or replacement of this surface should be carefully considered in an improvement program.
The 9" band of broom like finished cast in place concrete has been replaced in several locations in a manner that does not match in color or texture the original banding. This area of the entry terrace has also been altered by the introduction of handicapped railings. The exposed fine aggregate is complementary to the adjacent square coarse aggregate panels.

Feature Condition: Fair to Poor **Total Inventory:** 324 SF

Historic Rating: H **Priority:** Critical

Deficiency: Surface deterioration in exposed coarse aggregate areas from freeze thaw and use. The fine aggregate band is inappropriately altered by the introduction of replacement panels that do not match the original in color or texture. The replacement panels are a cool light gray and textured with a broom finish.

Recommendation: Consideration should be given to the approach to improving the condition of the 4'x4' exposed aggregate units. Alternatives could range from concrete restoration to replacement. The 9" band of broom-like finished concrete should be replaced to match the original finish, unit dimensions and color. Reposition handicapped ramp to not intrude on front approach. Replace ADA railings at the front entry with rails of a design and detail more appropriate to the character of the original design.

Materials: $46,000.00 **Labor:** $82,000.00 **Quantity:** **Total =** **$128,000.00**

EXTERIOR	3390	Landscape Struct: Ceremonial Terrace	Exposed Aggregate Concrete

Feature Description: The Ceremonial Terrace is 47'x53.5' cast in place large aggregate concrete terrace on grade bordered by an approximately 20' deep raised terrace on the east side of the at-grade terrace and an approximately 13' deep raised terrace on the north side. The raised terrace is four 6" risers above the at-grade terrace and is of exposed fine aggregate. The 4 riser 3 tread steps from the lower ceremonial terrace to the upper terrace provides access to and from the lobby and Assembly Room. Early photos show exposed aggregate pre-cast planters located on the upper portion of the plaza. A handicapped ramp has been added at the west edge of the terrace that provides ramp access between the lower terrace and the upper terrace that is at the same elevation as the interior floor of the building.

Feature Notes: The overall configuration of the original terrace is intact; however, it has been altered in two primary ways. First, the handicapped ramp has been added, which is a significant intrusion on the character of the terrace by virtue of its broom finish, color, detail and location. The second is the replacement of selected upper terrace modules of broom finished concrete of a lighter color than the weathered original concrete.

Feature Condition: Fair to Poor **Total Inventory:** 2,514.5 SF

Historic Rating: H **Priority:** Critical

Deficiency: The condition of the ceremonial terrace is similar to the condition of the entry terrace. The lower level of the ceremonial terrace is exposed large aggregate, while the upper presents a fine aggregate exposure. The primary deficieneies include: eroded concrete in exposed large aggregate area, not critical but noticeable; inappropriate ADA ramp intruding into the plaza area; replacement of upper sections of slab with concrete of inappropriate color and texture; installation of inappropriate ADA railings in style of railing and method of insertion into the concrete surface.

Recommendation: The treatment of the ceremonial terrace is similar to the entry terrace. Consider the repair/replacement of the exposed large aggregate areas on the lower terrace where appropriate to match the historic character in texture, color and dimension. Remove and reconsider the ADA ramp to and from the building. Replace non-historic upper terrace concrete units to match original in color, dimension and texture. Remove handicapped railings and replace with detail more sensitive to the design of the original building.

*Materials and Labor costs are included in Entrance Terrace costs

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

FEATURE INVENTORY: EXTERIOR

Walls - Ceilings - Floors - Windows - Doors - Finishes

All Estimable Items

Materials:	$163,192.00	Labor:	$225,590.00	Total =	$388,782.00

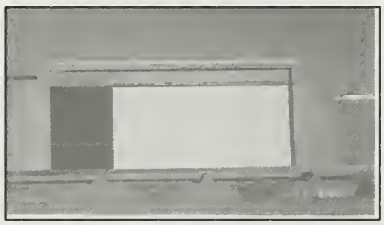
EXTERIOR | 4110 | Exterior Wall Surface/Cover | Wood/Aluminum

Feature Description: The original hollow metal windows and tongue and groove wall panels were replaced in 1976 with an aluminum window system with a textured silica coated metal panel (brand name of "Shawdowform"). The window patterns do not match the original, and the wall panel resembles the original treatment only in the vertical orientation of the metal paneling.

Feature Notes: Entire assembly is non-contributing.

Feature Condition: Poor **Total Inventory:** 1,078 SF (Panels)

Historic Rating: N **Priority:** Historical



Deficiency: Non-original material should be replaced.

Recommendation: Remove and install in its place wall systems to match original.

Materials:	$4,424.00	Labor:	$2,080.00	Quantity:	Total =	$6,504.00

EXTERIOR | 4111 | Exterior Wall Structure | Concrete

Feature Description: Approximately 130' x 130' footprint in an L-shaped configuration. The primary structure is steel reinforced cast-in-place concrete finished to be the primary exterior finish and a significant interior finish as well.

Feature Condition: Good **Total Inventory:** 10,990 SF

Historic Rating: H **Priority:** Critical

Deficiency: There has been some spalling in select areas, enough to cause concern and precipitate immediate attention to protecting the condition of the exposed concrete. Hairline cracks were also observed throughout. This foretells the progression of moisture infiltration into the concrete and associated deterioration in both the concrete and the reinforcing steel.

Recommendation: Further chemical testing of the concrete and reinforcing to assess best approach to rehabilitate or reconstruct. Costs reflect rehabilitation of 10% of surface area.

Materials:	$6,600.00	Labor:	$170,500.00	Quantity:	1100 SF	Total =	$177,100.00

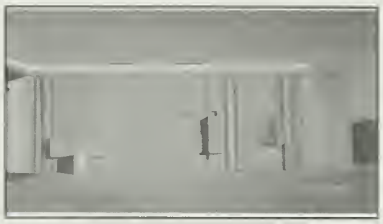
EXTERIOR | **4111** | **Exterior Wall Structure: Ornamental Wal** | **Concrete**

Feature Description: This section of wall is on the north side of the Entry Plaza. As part of the east in place structural wall, the architects of record sought to illustrate the plastic nature of concrete in a sculpted wall of relief with curves, depressions and projections.

Feature Notes: This feature is intact.

Feature Condition: Good to Excellent **Total Inventory:** 260 SF

Historic Rating: H **Priority:** NA



Deficiency: None identified

Recommendation: Evaluate for condition of concrete and reinforcing steel. Based on this evaluation, a management plan for the preservation and maintenance of this feature for the long term is advised. Investigate sealing of the concrete against weather. Costs reflect sealing of concrete.

Materials: $143.00 **Labor:** $390.00 **Quantity:** 260 SF **Total =** **$533.00**

EXTERIOR | **4115** | **Exterior Column/Post** | **Concrete**

Feature Description: The basic structure is a series of 1'x4' cast in place columns framing into roof beams and slabs in the low roof areas. The columns are both functional and aesthetic. While being structural, they are finished with exposed large aggregate with trowelled corners to produce the finish material for those areas of concrete exposed on both the exterior and interior. According to the original documents, no concrete was to have been painted.

Feature Notes: This feature is quite intact. While there are signs of concern with the condition of the concrete at the columns, for the most part the columns are in good condition with only isolated signs of spalling. Columns are experiencing notable erosion on some exposures.

Feature Condition: Good to Fair **Total Inventory:** 25 EA

Historic Rating: H **Priority:** Critical

Deficiency: Isolated signs of spalling with more significant areas of hairline cracking.

Recommendation: Conduct careful analysis of the concrete structure to understand the existing condition of the concrete and steel reinforcing. Produce a plan for remedial action and long term management of the concrete structure. Once the improvement and maintenance plan is in place, proceed to make remedial improvements consistent with sound historic preservation practices for a landmark property. Costs are based on remediation of 20% of surface area.

Materials: $432.00 **Labor:** $11,160.00 **Quantity:** 720 SF **Total =** **$11,592.00**

EXTERIOR	4117	Eave/Soffit	Concrete

Feature Description: The eaves and soffits of the structure are integral to the concrete structure. However, they deserve note due to the degree of exposure to sun, rain and temperature change they receive. The eaves are exposed reinforced concrete. The eaves are in some cases exposed on both the top (with no roofing or waterproofing) and the underside. They are also exposed on the vertical face, roughly 5" to 6" exposure.

Feature Notes: This area of the building exhibits some of the most extensive hairline cracking observed on the building. Presumably, this cracking is related to the exposure on the top and face of the eaves and soffits.

Feature Condition: Good to Fair **Total Inventory:**

Historic Rating: H **Priority:** Serious

Deficiency: Hairline cracking in concrete

Recommendation: Careful analysis of condition of the concrete. Develop plan to arrest deterioration and management plan for long term maintenance of integrity of the concrete. Investigate sealing against weather. Costs are based on rehabilitation of 50% of surface area.

Materials: $300.00 **Labor:** $7,750.00 **Quantity:** 500 SF **Total =** **$8,050.00**

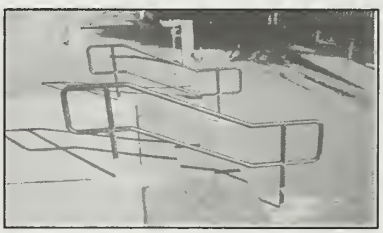
EXTERIOR	4133	Exterior Handicapped Railing	Schedule 40 Pipe

Feature Description: The pipe railings were added in recent years in response to the Americans with Disabilities Act. They are of design typical to that presented in the ADA manual, a style that meets the ADA requirements but does not respond to the character of the building while satisfying the ADA requirements for accessibility.

Feature Notes: They are functionally adequate.

Feature Condition: Good **Total Inventory:** 12 EA

Historic Rating: N **Priority:** Historical



Deficiency: Non-contributing

Recommendation: Remove and replace with design that both meets ADA requirements and is more compatible with the character of the building.

Materials: $7,040.00 **Labor:** $2,481.00 **Quantity:** **Total =** **$9,521.00**

EXTERIOR	4140	Exterior Window Unit - Arched Clearstory at Dome	Aluminum

Feature Description: These windows were installed when the aluminum windows were installed elsewhere in the building. These windows did not follow the pattern of the original windows in division or dimension.

Feature Notes: These windows are significant issues in the restoration of the building. Historically, they have been a source of water infiltration into the building. This defect could be a result of several factors. First, the coefficients of expansion and contraction between concrete and aluminum of approximately 40 feet could result in a difficulty in maintaining a sealed joint. Secondly, the limited amount of vertical dimension at the sill provided in the original design is substandard in current design practice making the ability to produce a watertight detail difficult.

Feature Condition: Fair to Poor **Total Inventory:** 4 arches of 40' length and 6' in height

Historic Rating: N **Priority:** Critical

Defieiency: Leaking at sill

Recommendation: Replace windows to match original in detail and configuration. Produce solution that represents original but corrects waterproofing details that appear to have caused difficulties in the past.

Materials: $35,640.00 **Labor:** $6,692.00 **Quantity:** **Total =** **$42,332.00**

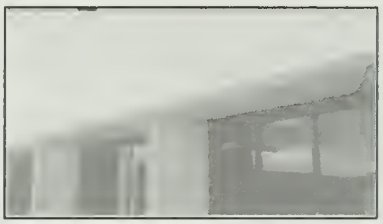
EXTERIOR	4140	Exterior Window Unit - Glass	Tinted Glass

Feature Description: The glass used in the Kawneer Window System is tinted plus it has a tinted film applied on the inside.

Feature Notes: The tint of the glass creates a significant change in the character of the building. From original photos, the building appeared to have a much more open feeling. It is believed the loss of the sense of openness was due to the introduction of tinted glass and tint film since the new windows were installed. The sense of openness is a significant feature of the building.

Feature Condition: Good to Fair **Total Inventory:** 2,081 SF

Historic Rating: N **Priority:** Historical



Defieiency: Non-contributing features

Recommendation: When a new window system is installed, identify the combination of energy and optical qualities of the new glass that will provide for functional windows that will also return the buildng to an original sense of openness.

Materials: $101,983.00 **Labor:** $21,679.00 **Quantity:** **Total =** **$123,662.00**

EXTERIOR	4150	Exterior Door Unit - Metal Doors - Mechanical Room	Aluminum

Feature Description: When the HVAC system was augmented in 1997, the decision was made to fill in two recessed window areas to house mechanical equipment, between column line 1 and 2 and, 3 and 4. While the interior wall position was retained, a new exterior wall was installed approximately flush with the foundation wall and constructed with an EIFS wall system. A pair of hollow metal doors were installed in each of the EIFS exterior walls.

Feature Notes: While only several years old, this material appears not to be holding up well to the mildew and moisture laden environment of coastal North Carolina.

Feature Condition: Good

Total Inventory: 190 SF

Historic Rating: N

Priority: Historical

Deficiency: Original design plans have been significantly altered with this addition. However, it will not be possible to remedy if the HVAC systems are not revised.

Recommendation: Remove and reclaim original configuration

*Materials costs are included with window and door replacement costs.

Materials: $0.00 **Labor:** $200.00 **Quantity:** **Total =** **$200.00**

EXTERIOR	4152	Exterior Door	Aluminum

Feature Description: Kawneer Aluminum Window/Door System, aluminum flush panel doors, hollow metal doors
The exterior doors in the original hollow metal window system were replaced by Kawneer Aluminum Doors that were a part of the Kawneer Window/Door System. In addition, there were several solid doors, notably to the restrooms, offices and mechanical room.

Feature Notes: The exterior doors were installed with the aluminum curtain wall window system. The anodized "Dark Bronze" finishes match the existing window system. It should be noted that at the time of the installation of the aluminum window system and door system, several exterior doors were moved. Notably, the pair of doors from the entrance terrace was moved one bay to the north. One pair of double doors on the east side of the lobby was removed completely, and the other was moved one bay to the north. Aluminum flush panel doors appear to have replaced original doors. The construction drawings do not include a door schedule. However, it is reasonable to assume that the original solid exterior doors were hollow metal, consistent with the frames and window system.

Feature Condition: Good

Total Inventory: 4 pr. Kawneer Double
3 Single Leaf Flush
1 pr. Flush

Historic Rating: N

Priority: Historical

Deficiency: Non-contributing

Recommendation: Remove and replace to match original character detail

Materials: $6,630.00 **Labor:** $2,658.00 **Quantity:** **Total =** **$9,288.00**

FEATURE INVENTORY: INTERIOR ENVELOPE

Walls - Ceilings - Floors - Windows - Doors - Finishes

All Estimable Items

Materials:	$61,128.00	Labor:	$49,601.00	Total =	$110,729.00

EXTERIOR | 4210 | Interior Wall Surface/Cover | Glazed Tile

Feature Description: The structural glazed tile are a very appropriate and sound material for the restrooms. They are in very good condition and except for the installation of non-original restroom fixtures, appear to be in original condition.

Feature Notes: It is important to be careful to not damage the tile with indiscriminant penetrations to mount features.

Feature Condition: Good to Excellent **Total Inventory:** 1,303 SF

Historic Rating: H **Priority:** N/A

Deficiency: Penetrations for mounting non-original fixtures in the restroom.

Recommendation: When building is restored, consider complete solution of ADA and mount additional fixtures that meet ADA requirements in every way and avoid additional penetrations in the future.

Materials:	$1,185.00	Labor:	$450.00	Quantity:	Total =	$1,635.00

EXTERIOR | 4210 | Interior Wall Surface | Gypsum Wallboard

Feature Description: Infill walls between column lines 1 and 2, and 3 and 4 on the north wall are gypsum wall board on wood studs.

Feature Notes: These walls were installed when the supplemental HVAC was installed in 1997. These walls replace windows that faced north up the flight line.

Feature Condition: Good to Excellent **Total Inventory:** 210 SF

Historic Rating: N **Priority:** Critical

Deficiency: Non-contributing

Recommendation: If the HVAC is relocated, remove infill panels and replace with window system to match the original in profile, dimension and color.

Materials costs included in window and door replacement costs.

Materials:	$0.00	Labor:	$315.00	Quantity:	Total =	$315.00

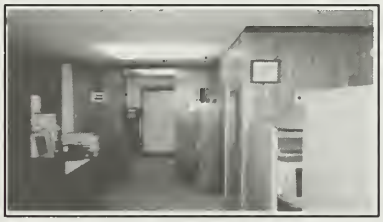
INTERIOR	4211	Interior Wall Surface/Cover	Wood

Feature Description: Wood framing with vertical tongue and groove cypress panels applied to both sides. This wall assembly brings the detail of the exterior cedar wall panels into the interior. The cypress tongue and groove boards are applied to wood studs and divide the museum and lobby from the office space.

Feature Notes: The wall panels appear to have the original finish and appear be of the original installation. These panels are located between the office area and the museum.

Feature Condition: Good to Excellent **Total Inventory:**

Historic Rating: H **Priority:**



Deficiency: None identified

Recommendation: Keep panels, protect from other work, restore finish as appropriate.

Materials: $638.00 **Labor:** $3,375.00 **Quantity:** **Total =** **$4,013.00**

INTERIOR	4211	Interior Wall Structure	Concrete

Feature Description: The mechanical room walls were constructed of CMU to produce a fire rated separation between the mechanical equipment and the offices and museum.

Feature Notes: The CMU on the building appears substantially unaltered.

Feature Condition: Good **Total Inventory:**

Historic Rating: H **Priority:** N/A

Deficiency: None identified.

Recommendation: This area of the building is a part of the original design but could be considered a second priority space for restoration if it was deemed desirable to produce an addition for the building that retained the historic character of the Visitor Center while accommodating an expansion of exhibits, office space and gift shop. There are no recommendations for treatment at this time.

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

INTERIOR	4215	Interior Column/Post	Concrete

Feature Description: Poured in concrete structural columns with exposed aggregate finish with trowelled edges.

Feature Condition: Good **Total Inventory:** 12 EA

Historic Rating: H **Priority:** Critical

Deficiency: Trowelled edges of the columns have been painted. No mention in original documentation indicating this painted treatment was to be provided. However, testing indicates that this is lead-based paint.

Recommendation: Remove (abate) paint and restore to original finish.

Materials: $1,361.00 **Labor:** $6,048.00 **Quantity:** 216 SF **Total =** **$7,409.00**

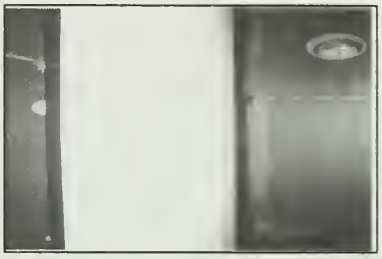
INTERIOR	4220	Interior Ceiling Surface/Cover - Museum	Acoustical Tile

Feature Description: The 12"x12" acoustical tile have been applied to the underside of the concrete roof decking presumably to enhance the acoustical qualities of the room. The tiles are concealed behind the suspended honeycombed metal ceiling and are painted a deep royal blue.

Feature Notes: This feature appears to be substantially intact. Due to it still remaining in the building, it is assumed that these tiles and its mastic were determined to not contain asbestos. This should be confirmed in the records of the abatement testing performed on the building in the past.

Feature Condition: Excellent to Good **Total Inventory:** 1,488 SF

Historic Rating: H **Priority:**



Deficiency: None identified.

Recommendation: Retain and restore as required.

Materials: $419.00 **Labor:** $420.00 **Quantity:** **Total =** **$839.00**

INTERIOR	4220	Interior Ceiling Surface/Cover - Museum	Acoustical Tile

Feature Description: Open honeycomb profile metal panels suspended by wire hangers from inserts into concrete roof structure. These panels are an open profile resembling a grill with tight honeycomb pattern. The original objective was to conceal lighting, piping and ductwork above. Surface applied (to underside of concrete structure) can lights were located to provide a filtered light through the suspended honeycomb metal suspended ceiling to the museum area.

Feature Notes: The honeycomb suspended ceiling panels appear to be original and appear to be the original black finish.

Feature Condition: Good to Excellent **Total Inventory:** 1,100 SF

Historic Rating: H **Priority:**

Deficiency: Possibly some modification to the panels has taken place to introduce non-original exhibit spot lights.

Recommendation: Retain honeycombed suspended panels and restore areas of modification where appropriate.

Materials: $1,338.00 **Labor:** $1,132.00 **Quantity:** **Total =** **$2,470.00**

INTERIOR	4220	Interior Ceiling Surface/Cover - Lobby	Metal/Acoustical Tile

Feature Description: Metal "T" track with 2'x4' acoustical lay in ceiling panels. This ceiling treatment is not original and appears to have replaced the original honeycombed suspended ceiling panels as found in the museum area and indicated for the Lobby in the original drawings.

Feature Notes: This feature is non-contributing.

Feature Condition: Good to Fair **Total Inventory:** 1,188 SF

Historic Rating: N **Priority:** Historical

Deficiency: Non-contributing

Recommendation: Remove and replace with material to match original honeycombed. suspended ceiling.

Materials: $12,634.00 **Labor:** $7,162.00 **Quantity:** **Total =** **$19,796.00**

INTERIOR	4220	Interior Ceiling Surface/Cover - Restroom	Metal/Wood

Feature Description: Metal "T" track suspended by wire, painted plywood lay in panels. This feature is not the original installation. Both the track and the plywood panels appear to have been painted since they were installed.

Feature Notes: The original architectural documents indicate acoustical tile (presumably suspended) at 8'-6" as is indicated in the office area. Given that these spaces are accessed from the exterior, it is likely that they received more exposure to humidity and abuse than those in the office area.

Feature Condition: Fair to Poor **Total Inventory:** 462 SF

Historic Rating: N **Priority:** Critical

Deficiency: Non-contributing

Recommendation: Remove and replace to match original.

Materials: $938.00 **Labor:** $614.00 **Quantity:** **Total =** **$1,552.00**

INTERIOR	4220	Interior Ceiling Surface/Cover - Administrative Offic

Feature Description: Concealed Spline 12"x12" Suspended. The ceiling is located at a height of 8'-6" above finished floor.

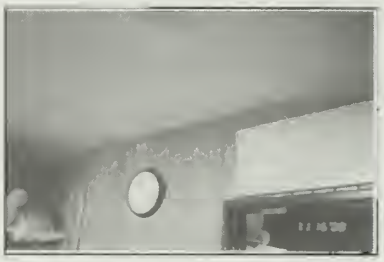
Feature Notes: This ceiling treatment appears to be original.

Feature Condition: Good **Total Inventory:** 1,012 SF

Historic Rating: H **Priority:**

Deficieney: Discoloration with age is primary change from original.

Recommendation: Retain and restore as appropriate.



Materials: $2,992.00 **Labor:** $1,960.00 **Quantity:** **Total =** **$4,952.00**

INTERIOR	4220	Interior Ceiling Surface/Flight Room Dom

Feature Description: Exposed Concrete with Spray-on Acoustical Finish - The ceiling finish is exposed concrete with sprayed on, non-asbestos containing acoustical finish. Documents on past work on the structure indicate that the dome originally had a sprayed-on, asbestos containing acoustical finish applied to the cast in place concrete.

Feature Notes:

Feature Condition: Excellent to Good **Total Inventory:** 1,600 SF

Historic Rating: N **Priority:** Critical

Deficieney: Non-contributing finish due to the loss of the texture of the acoustical material and the exposure of the board form pattern on the underside of the dome.

Recommendation: Apply spray-on acoustical material to underside of dome with texture, color and finish to match original.

Materials: $912.00 **Labor:** $976.00 **Quantity:** **Total =** **$1,888.00**

INTERIOR	4220	Interior Ceiling Surface/Flight Room Low Ribbed	Concrete

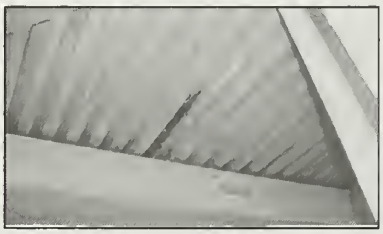
Feature Description: The perimeter of the Flight Room contains a lower ceiling of cast in place concrete ribs extending from the interior of the building to the exterior window line. The ribs are also cast to receive two custom light fixtures with integrated ductwork on each side.

Feature Notes: The ribs have been partially covered over by furring and gypsum wallboard chases to contain supplemental HVAC ductwork.

Feature Condition: Excellent to Good **Total Inventory:** 2,173 SF

Historic Rating: H, Ribbed Ceiling
N, Furred Ductwork

Priority: Critical for removal of Furred ductwork



Deficiency: Concealed ductwork is non-contributing

Recommendation: Remove ductwork and furring if alternative solution to HVAC is identified and can be integrated more sensitively into the building.

Materials: $4,167.00 **Labor:** $4,556.00 **Quantity:** **Total =** **$8,723.00**

INTERIOR	4230	Interior Floor Surface - Tile	

Feature Description: The square floor tiles were identified in the offices and staff restroom. It is not clear that the existing tiles are original.

Feature Notes: These tile have been covered over by the carpet in all spaces except the area now used as a gift shop storage area and the staff restroom.

Feature Condition: U **Total Inventory:** Unknown

Historic Rating: H **Priority:** Critical

Deficiency: Covered over by carpet.

Recommendation: Remove carpet, test for original composition, replace or restore as appropriate.

Materials: $28,908.00 **Labor:** $8,520.00 **Quantity:** **Total =** **$37,428.00**

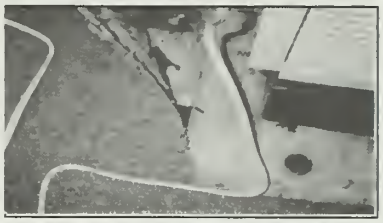
INTERIOR | 4230 | Interior Floor Surface | Carpet

Feature Description: A reddish brown carpet of an indoor/outdoor style has been installed over the entire public area and offices.

Feature Notes: This carpet is exhibiting considerable wear. In addition, the carpet was installed over the original floor covering.

Feature Condition: Poor **Total Inventory:** 9,000 SF

Historic Rating: N **Priority:** Critical



Deficiency: Non-contributing

Recommendation: Remove carpet. Replace with material, rubber tile, to match original after cracking and settlement of slab have been addressed.

*Materials costs are included in Interior Floor Surface - Tile costs

Materials: $0.00 **Labor:** $2,400.00 **Quantity:** **Total =** **$2,400.00**

INTERIOR | 4230 | Interior Floor Surface | Epoxy Flooring

Feature Description: The original public restroom floors were scheduled to be colored concrete. These floors have been epoxyed with a white speckle on a brown field of epoxy coating.

Feature Notes: The durability of the epoxy is much better than the colored concrete. However, the color selection of the epoxy coating is not sensitive to the overall historic character of the building and the original color of the stained concrete (likely a reddish tint based on evidence in other parts of the building).

Feature Condition: Good **Total Inventory:** 504 SF

Historic Rating: N **Priority:** Historical

Deficiency: Non-contributing

Recommendation: Consider replacement with either epoxy or other suitable non-original material or restore colored concrete. The treatment of this finish will be dependent on the proposed use of what is now the restroom space.

Materials: $3,444.00 **Labor:** $2,114.00 **Quantity:** **Total =** **$5,558.00**

INTERIOR | 4230 | Interior Floor Surface | Concrete

Feature Description: Painted concrete.

Feature Notes: In the Mechanical, Storage, Restrooms and janitorial spaces exposed concrete was specified as the finished floor. In the areas specified for exposed concrete, colored concrete was specified for the restrooms and janitorial spaces. Only the Mechanical Room and the janitorial closet have exposed concrete floors now. In the janitorial closet the floor is painted; the underlying concrete was colored.

Feature Condition: Good **Total Inventory:** 923 SF

Historic Rating: N - Paint
H - Concrete **Priority:** Historical

Deficiency: Color not original

Recommendation: Restore to original color.

Materials: $92.00 **Labor:** $369.00 **Quantity:** 923 SF **Total =** **$461.00**

INTERIOR	4231	Interior Floor Structure	Concrete

Feature Description: 4" concrete slab cast in place on 4" compacted soil reinforced with 6x6 - 8x8 welded wire fabric.

Feature Notes: Slab was cast on fill after the foundation wall was in place. It is difficult to determine the overall condition of the slab due to the presence of carpet throughout the building. However, considerable settling was observed along the north wall in the Museum and Assembly Room. Given the degree of settling in this area, it is of concern that more settling or other related deterioration due to subsurface conditions have taken place over time.

Feature Condition: Fair to Poor **Total Inventory:** Approximately 10,000 SF of enclosed floor area

Historic Rating: H **Priority:** Critical

Deficiency: Settling of the floor slab by as much as 2" - 3" was observed on the north wall of the Assembly room and Museum room. A topping has been applied under the carpet to achieve an appropriate alignment of the carpet and the wall at the floor.

Recommendation: Carefully examine entire floor area for settling. Remove carpeting and tile where required for a thorough examination. Rehabilitate the settled areas as follows. Remove carpeting, tile, and topping (as required). Prepare concrete in areas of settlement by scarifying and exposing aggregate. Cast new concrete to proper elevation and provide appropriate finish for restored floor covering. Provide jointing in new concrete and floor covering to provide for future possible settling and/or cracking of concrete.

Materials: $750.00 **Labor:** $8,400.00 **Quantity:** 1000 SF **Total =** **$9,150.00**

INTERIOR	4250	Interior Door Unit	

Feature Description: Solid Core Doors with Hollow Metal Frames.

Feature Notes: There are a limited number of interior doors in the building. The only ones that appear to not be original are the doors between the offices and lobby. The original frames appear to be intact and in overall good condition.

Feature Condition: Good **Total Inventory:** 5 EA

Historic Rating: H **Priority:** Critical

Deficiency: Non-original doors

Recommendation: Replace non-original doors to match original.

Materials: $100.00 **Labor:** $40.00 **Quantity:** **Total =** **$140.00**

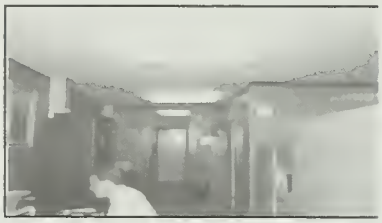
EXTERIOR	4290	Interior Envelope: Movable Partition	Wood

Feature Description: Cypress Reverse Batten Panels & Metal Accessories. The movable partitions were designed to allow for the office space to be modified over time to accommodate changes in personnel and their assignments.

Feature Notes: This partition is located in the office area along column line "C". This wall is noted on the drawings as "movable" but appears to be in its original location. What is now the small hallway and partition that creates the gift shop storage room was originally intended to be the Superintendent's Office. The additional office north of the original wall delimiting the "Superintendent's Office" was added at an undetermined time to create an additional office in the building. This new partition uses tongue and groove material similar to the partition located in the alignment shown on the drawings. While not shown on the original plans, this wall does, in fact, conform to the movable partition design. It appears to fulfill the intent of the original design and should be considered a significant feature.

Feature Condition: Good to Excellent **Total Inventory:** 22 LF

Historic Rating: H **Priority:**



Deficiency: None

Recommendation: None

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

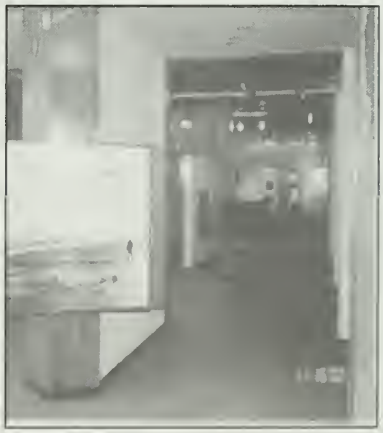
EXTERIOR	4290	Interior Envelope: Exhibit Mounting Components & Built-in Exhibit Cases	Wood

Feature Description: Custom designed cypress panel exhibit cases and steel mounting brackets for exhibit display. The cypress panels with metal angle brackets, posts and clips appear to be original.

Feature Notes: The only deviation from the original exhibit fixtures observed was the case mounted in the west wall of the museum between column lines B and C. This case appeared to not conform with the trim over the top of the case which was narrower than the case width.

Feature Condition: Good to Excellent **Total Inventory:** 1 EA (West Wall)

Historic Rating: H **Priority:**



Deficiency: Only the deviation from the apparent original layout as stated above.

Recommendation: Preserve, protect, and, as appropriate, restore to match original. The exhibit issue is one for further discussion related to the expansion of the visitor center and museum. From a preservation standpoint, the exhibits appear virtually unchanged from those indicated in the original architectural drawings. It is significant to note that the exhibit design is a part of the architectural solution. However, a reconciliation between the preservation objectives and the interpretative objectives must be reached in defining an approach to the historic exhibits.

Materials: $1,250.00 **Labor:** $750.00 **Quantity:** **Total =** **$2,000.00**

FEATURE INVENTORY: ROOF

Surface - Structure - Chimney - Flashing - Downspout

All Estimable Items

Materials:	$83,719.00	Labor:	$206,341.00	Total =	$290,060.00

ROOF	4310	Roof Surface	Foam

Feature Description: The roof is installed in two primary conditions, a flat horizontal application and an application on the dome. The material appears to be a blown on dense foam roofing material with white film coat over foam layer. The roof was installed in 1982. From a cursory review of the records, it appears the roof was a poor performer from the outset. A slight tapered insulation was installed with the roof, though any benefit the taper was to provide was lost in the gross distortion of the roof presumably caused by exposure to the elements. The on-site staff indicate the foam roof over-coating has been re-coated several times in recent years. From testing in several locations, the flashing at the roof edge is copper. It is either original flashing or the flashing application is of advanced quality than the existing roof type.

Feature Notes: The existing roof is not the original roof. It is not known if the older roof(s) material is in place under the current exposed roof material.

Feature Condition: P

Total Inventory: 2,862 SF of Dome Area
9,667 SF of Flat Area

Historic Rating: N

Priority: Critical

Deficiency: Roof leaks. Emergency patching has taken place in recent weeks. However, this action should only be considered temporary and in the shortest term.

Recommendation: Replace existing roof with new roof. Follow original design intent with the consideration of modern variants of original built-up roof. Consider modified bitumen roof or "Hydrostop" type roof.

1. Investigate the full strata of the existing roofing material.
2. Appropriately remove and dispose of existing roofing components to original deck.
3. Repair structural deck if necessary and according to findings when roofing and, if present, insulation, is removed.
4. Design new roofing application. Coordinate with Flashing (See entry for Flashing below)
5. Install new roof membrane as per plans and specifications prepared in #4 above.

Materials:	$68,683.00	Labor:	$95,561.00	Quantity:	Total =	$164,244.00

ROOF	4311	Roof Structure - Dome	Concrete

Feature Description: The dome is a 40'x40' thin shell structure 3" thick. The dome is supported by two columns at each corner. The dome projects vertically approximately 12' above the columns. The dome was poured on a wood form as indicatec by the interior surface. The dome was cast in place. This structure was an advanced design for its time.

Feature Notes: Overall the shell appears in good condition. However, the condition can only be observed from the interior of the Assembly Room. When the re-roofing is performed, an important part of that assignment will be to evaluate the dome, determine the extent of any deterioration and identify long term treatments and management practices to assure the dome remains sound. Given only 3" of cross section, there is little room for error in the deterioration of this feature.

Feature Condition: Good **Total Inventory:** 1,600 SF

Historic Rating: H **Priority:** Serious

Deficiency: No identified deficiency. However, given the history of poor roof performance, there is concern that the upper side of the dome structure has been exposed to moisture and to freeze-thaw cycles.

Recommendation: Further investigation of this structure by a specialist in thin-shell construction should be a priority in the sequence of investigation and improvement of the building. The specialist should conduct a careful evaluation of the dome structure to understand the condition of the concrete and steel reinforcing and develop remedial improvements consistent with sound preservation practices and a long-term management plan for the dome's maintenance. Cost is based on rehabilitation of 50% of surface area.

Materials: $720.00 **Labor:** $16,400.00 **Quantity:** 800 SF **Total =** **$17,120.00**

ROOF	4311	Roof Structure - Arched Eave at Dome	Concrete

Feature Description: Arched eave extending from dome and projecting over low roof 6'. The upper eave arches in the opposite direction from the dome and provides a wing-like character to the upper roof. Incorporated with the profile of the dome, the arched eave creates a clear story on all four sides of the dome.

Feature Notes: The underside of the arched eaves are the most noticeable areas of spalling. Of particular note are the close roofs of steel wire which appear to have been positioned within 1/4" to 1/8" of the face of the concrete. The most serious spall observed on the entire building was on the northeast corner of the dome column/eave. While significant spalling was observed, there is no reason to suspect based on the observations made for this report that the structural integrity of the eaves are in question.

Feature Condition: Good to Fair **Total Inventory:** 2000 SF

Historic Rating: H **Priority:** Critical

Deficiency: Spalling

Recommendation: Conduct a careful evaluation of the cause for the spalling on the arched eaves. Develop and implement remedial improvements consistent with good preservation practices and prepare and implement along-term management plan for the the preservation of the exposed cast in place arched concrete eaves. Cost is based on rehabilitation of 70% of surface area.

Materials: $840.00 **Labor:** $24,500.00 **Quantity:** 1400 SF **Total =** **$25,340.00**

ROOF	4311	Roof Structure - Concrete Roof Slab at Low Roof	Concrete

Feature Description: The two low roofs are 5" or 6" thick slabs spanning between roof beams.

Feature Notes: The roof slab appears to be in sound condition. However, given the history of failing roof systems over a long period of time the true condition of the roof deck will not be known until some intrusive investigation into and under the existing roof system can be conducted. Given the actual condition of the roof slab, remedial improvements should be identified and implemented using the appropriate preservation practices to secure the roof slab condition prior to re-roofing the building.

Feature Condition: Good to Unknown **Total Inventory:** 9,063 SF

Historic Rating: H **Priority:** Serious

Deficiency: None identified from visual inspection. However, concern for unknown under existing roof given the history of failed roofing systems on the building.

Recommendation: Investigate slab condition prior to design of new roof. Incorporate any slab repair in the scope of work related to replacing the existing roof. Cost is based on rehabilitation of 30% of surface area.

Materials: $1,680.00 **Labor:** $43,400.00 **Quantity:** 2800 SF **Total =** **$45,080.00**

ROOF	4323	Skylight	

Feature Description: 4'x 4' dome

Feature Notes: The 4 skylights, 2 over each public restroom, appear to be in their original location. However, the existing skylights do not appear to be the original. The original drawings indicate a glass block detail for the skylight. No information has been found to indicate the date of installation of the existing skylight.

Feature Condition: Good **Total Inventory:** 4 EA

Historic Rating: H (location)
N (type) **Priority:** Historical

Deficiency: Not original

Recommendation: Replace skylight to match original with improvements to prevent leaks.

*Materials and Labor costs are included in the Roof Surface costs.

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

ROOF | 4340 | Roof Flashing | Copper

Feature Description: Primary roof flashing conditions are at the edge. It is possible that the flashing has been detached from the original roof if the original roofing was removed prior to the application of the existing foam roof on the building.

Feature Notes: By the good quality and degree of aging of the existing copper flashing, it is likely that the existing copper flashing is original.

Feature Condition: Good **Total Inventory:**

Historic Rating: H **Priority:**

Deficiency: Main deficiency is the likely deterioration of the roofing material to which it was supportive.

Recommendation: Replace all flashing with copper to match existing. Improve flashing detail at sill of arched windows.

*Materials and Labor costs are included in the Roof Surface costs.

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

ROOF | 4350 | Roof Drainage System

Feature Description: Roof drains are sump-type drains with center dome for protection against leaves, paper, and other debris. Cast iron body with cast iron pipe for rain leaders. Top roof rain leaders and roof drains along with the low roof branch lines and roof drains.

Feature Condition: Poor **Total Inventory:** 11

Historic Rating: H **Priority:** High

Deficiency: Old, rusted and corroded body roof drains and rain leaders leave rust stains from draining.

Recommendation: Replace existing roof drains with similar type body style at the same time as the roof is being replaced. Add two new roof drains, connect new rain leaders and run to exterior of building. Add new drain lines as necessary. Add 2 new drywells. Clean out and flush existing rain leaders to remain.

Materials: $10,596.00 **Labor:** $8,480.00 **Quantity:** **Total =** **$19,076.00**

ROOF	4390	Roof - Facia	Concrete

Feature Description: Exposed cast in place concrete facia.

Feature Notes: None

Feature Condition: Fair **Total Inventory:** 1500 SF

Historic Rating: H **Priority:** Critical

Deficiency: A significant area of cracking is at cold joints in the concrete. Cracking in these areas extend back into the roof deck and is evident on the underside of the soffit by moisture stains.

Recommendation: Remove spray-on roofing material. Rehabilitate concrete. Costs reflect both removal of roofing material and rehabilitation of 100% of surface area.

Materials: $1,200.00 **Labor:** $18,000.00 **Quantity:** 1500 SF **Total =** **$19,200.00**

FEATURES INVENTORY: FOUNDATION

Surface - Foundation Piers, Beams, Wall

All Estimable Items

Materials: $750.00 **Labor:** $19,375.00 **Total =** **$20,125.00**

FOUNDATION	4411	Foundation Wall-Architectural Observation	Concrete

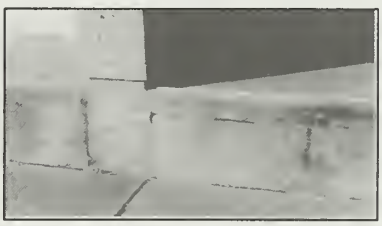
Feature Description: The 2' high concrete foundation wall produces a pedestal on which the building sits. The foundation wall is also the finished material for the building pedestal. The finish is an exposed fine aggregate.

Feature Notes: The foundation walls vary in condition. Significant spalling was observed on the west face in particular

Feature Condition: Fair to Poor **Total Inventory:** 2500 SF

Historic Rating: H **Priority:** Critical

Deficiency: Spalling at joints.



Recommendation: Conduct a thorough investigation to understand the cause of spalling conditions. Repair using sound preservation practices and concrete repair techniques. Costs reflect rehabilitation of 50% of surface area.

Materials: $750.00 **Labor:** $19,375.00 **Quantity:** **Total =** **$20,125.00**

FOUNDATION **4460** **Foundation**

Feature Description: Cast-in--place piers and grade beams supported on creosoted wooden piles

Feature Notes: Inaccessible to direct observation. No apparent signs of settlement of footings. See comments on concrete slab #4321

Feature Condition: Good **Total Inventory:**

Historic Rating: II **Priority:**

Deficiency: None

Recommendation: Continue to observe structure for evidence of possible future settlement.

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

FEATURES INVENTORY: FURNISHINGS

FURNISHINGS **4530** **Furnishing - Lobby**

All Estimable Items

Materials: $6,150.00 **Labor:** $6,150.00 **Total =** **$12,300.00**

Feature Description: Miscellaneous Display Fixtures

Feature Notes: This furniture was installed to support the introduction of a gift shop in the space originally designated as a lobby. The display fixtures appear to be standard display shelving and racks. The entry desk is located on the west wall of the lobby opposite the entry doors. None of the fixtures and furniture are original or in locations originally designated for furniture.
The original plans indicate a custom designed information desk fabricated from cypress with walnut butterfly inserts. These fixtures, which are shown in early photographs to have been installed, no longer exist. These pieces are significant to the original design.

Feature Condition: Good **Total Inventory:**

Historic Rating: N **Priority:** Historical

Deficiency: Non-contributing

Recommendation: Remove non-contributing furniture and gift shop fixtures. Reinstall replicas of original furniture pieces. The key to this move will be to shape the entry experience to integrate the original pieces into the current function of the building.

Materials: $6,150.00 **Labor:** $6,150.00 **Quantity:** **Total =** **$12,300.00**

FEATURE INVENTORY: FIRE/LIFE/HEALTH/SAFETY

FIRE/LIFE/HEAL | **4770** | **Handicapped Access** | **Concrete/Steel**

All Estimable Items

Materials:	$4,680.00	Labor:	$5,970.00	Total =	$10,650.00

Feature Description: Two recently installed handicapped access ramps exist; one at the front of the building to access the entrance plaza and one to access the upper ceremonial plaza at the back. Though these are not part of the original design they are mandated by Federal Law and cannot be completely eliminated. The front access ramp is surrounded by unpainted galvanized pipe rails. The back access ramp handrails have been painted to match other recently installed handrails.

Feature Notes: Ramps have no reference to the historic detailing. Ramps are an intrusion on the historic entry and ceremonial plazas. Ramp finish is of a broom type and color is cooler and lighter than original weathered concrete on the plazas. The railings make no attempt to respond to the character of the building.

Feature Condition: Good **Total Inventory:** 2 EA

Historic Rating: N **Priority:** Historical

Deficiency: Not in character with the building or terrace.

Recommendation: Remove and replace with a design of the handicapped access in a manner more considerate of the character of the building.

Materials:	$4,680.00	Labor:	$5,970.00	Quantity:	Total =	$10,650.00

FIRE/LIFE/HEAL | **4774** | **Handicapped Access Restroom**

Feature Description: See descriptions under Plumbing

Feature Notes:

Feature Condition: **Total Inventory:**

Historic Rating: **Priority:**

Deficiency:

Recommendation:

Materials:	$0.00	Labor:	$0.00	Quantity:	Total =	$0.00

FEATURES INVENTORY: ELECTRICAL GENERATING SYSTEM

ELECTRICAL **5420** **Primary Electrical Distribution System**

All Estimable Items

Materials:	$3,000.00	Labor:	$5,000.00	Total =	$8,000.00

Feature Description: The existing electrical distribution system consists of 2 - 50 kva utility transformers in an open delta configuration with Phase A as the hot phase. The two utility transformers are located on the east side of the transformer room. The secondary cables are 3# 350 MCM in a 3 1/2" PVC conduit running underground to the metering cabinet located in the east wall of the mechanical room. From the metering cabinet, 3 - 350 MCM cables in a 3 1/2" PVC conduit runs to the service entrance fused disconnect switch. The service entrance fused disconnect switch is a 400A fused @ 400A. The service entrance disconnect switch provides protection to the facility and to the distribution panel located next to the service entrance disconnect switch. The distribution panel is a Federal Pacific, 400A, 120/240V, 3-phase with a main lug. The distribution panel contains 12 circuit breakers labeled as follows: 1) Air Comp (20A); 2) Water Heater (50A); 3) Small Pump & Air Ctrl (20A); 4) Space; 5) Kiosk (50A); 6) HVAC Panel (100A); 7) Circulator 2 HP (15A); 8) No label (100A); 9) Sub Panel (50A); 10) Panel #2 (100A); 11) Ltg Panel (150A); 12) Chiller (250A). There are four electrical panels in this facility including the distribution panel. Three (3) electrical panels feed from the distribution panel as follows:

1. Panel #2 located next to the distribution panel in the mechanical room provides power to the boiler, chiller control, condenser 1 of 2, lunch room, and office receptacles;
2. Lighting panel located in the museum area provides power to lighting throughout the facility, exhaust fan, office receptacles and four air handlers;
3. HVAC panel located in the HVAC room provides power to the added HVAC equipment.

Feature Notes: While the electrical system is "historic" because of its age, it is inadequate to meet code and current electrical requirements. It should, therefore, be replaced regardless of its historic designation.

Feature Condition: See Below **Total Inventory:** See Below

Historic Rating: Some is H **Priority:** High

Deficiency: See individual areas listed below

Recommendation: See individual areas listed below. Costs in this area are for demolition of existing service and installation of new panel for HVAC support, including cables, e0nduits and circuit breakers.

*Materials and Labor costs for service in individual areas are included in areas below.

Materials:	$3,000.00	Labor:	$5,000.00	Quantity:	Total =	$8,000.00

ELECTRICAL | 5420 | Electrical Distribution System - Mechanical Room

All Estimable Items

Materials:	$840.00	Labor:	$19,370.00	Total =	$20,210.00

Feature Description: The mechanical room contains the metering cabinet, service entrance fused disconnect switch, main distribution panel, and sub panel. The electrical panels in this room are original. The recommended life for this type of equipment is 25 years. The equipment is in fair condition; however, it has passed its lifespan. There are signs of deterioration in the electrical panels and cables. Feeder cable insulation is deteriorating due to age and must be replaced.

Feature Notes:

Feature Condition: Fair **Total Inventory:**

Historic Rating: H **Priority:** High

Deficiency: The distribution panel is a Federal Pacific panel. The manufacturer is out of business, making it difficult to replace any parts. In addition to the deterioration problems, the clearance between the electrical panel and the boiler is only 26", which is in violation of the NEC Article 110 -1b (a), which requires a minimum of 36" around electrical panels for maintenance.

Recommendation: Replace electrical panels and cables. Provide adequate clearance between panels and other equipment.

Materials:	$400.00	Labor:	$18,000.00	Quantity:	Total =	$18,400.00

Deficiency: Conduits penetrate the south wall with no seal.

Recommendation: Seal conduit where it penetrates walls.

Materials:	$5.00	Labor:	$45.00	Quantity:	Total =	$50.00

Deficiency: Conduit runs from panel #2 to boiler at 72" AFF, causing safety hazard to personnel.

Recommendation: Reinstall conduits to provide safe maintenance and operation

Materials:	$0.00	Labor:	$100.00	Quantity:	Total =	$100.00

Deficiency: No exit signs installed

Recommendation: Install exit signs

Materials:	$80.00	Labor:	$100.00	Quantity:	Total =	$180.00

Deficiency: No emergency light installed.

Recommendation: Install emergency light pack.

Materials:	$80.00	Labor:	$100.00	Quantity:	Total =	$180.00

Deficiency: One receptacle installed at 72" AFF. No other outlet installed.

Recommendation: Install receptacles per NEC requirements.

Materials:	$100.00	Labor:	$400.00	Quantity:	Total =	$500.00

Deficiency: Additional light fixtures are required for adequate lighting.

Recommendation: Install additional light fixtures.

Materials:	$75.00	Labor:	$225.00	Quantity:	Total =	$300.00

Deficiency: Phone cables are exposed and installed with no protection

Recommendation: Provide protection to phone cables

Materials: $100.00 **Labor:** $400.00 **Quantity:** **Total =** **$500.00**

ELECTRICAL 5420 Electrical Distribution System - Administration Area

All Estimable Items

Materials: $1,460.00 **Labor:** $6,900.00 **Total =** **$8,360.00**

Feature Description:

Feature Notes:

Feature Condition: Fair **Total Inventory:**

Historic Rating: N **Priority:** High

Deficiency: There are a number of light fixtures in the administration offices with no protective lenses. The lighting is not distributed efficiently due to the location of the fixtures.

Recommendation: Redesign lighting utilizing existing conduits.

Materials: $600.00 **Labor:** $4,000.00 **Quantity:** **Total =** **$4,600.00**

Deficiency: No exit signs installed

Recommendation: Install exit signs

Materials: $60.00 **Labor:** $300.00 **Quantity:** **Total =** **$360.00**

Deficiency: No emergency light installed.

Recommendation: Install emergency light pack.

*Materials and Labor included with redesign of lighting.

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

Deficiency: Receptacles are minimal and do not meet NEC requirements. Extension cords are used extensively to make up for the lack of outlets. Multiple extension cords are powered from one outlet, branching off with extension cords with cables crossing the floor and covered with tape to provide power to computers, printers, monitors, etc.

Recommendation: Install additional receptacles per NEC requirements.

Materials: $500.00 **Labor:** $1,500.00 **Quantity:** **Total =** **$2,000.00**

Deficiency: Phone cables are exposed and installed with no protection

Recommendation: Provide protection to phone cables

Materials: $100.00 **Labor:** $400.00 **Quantity:** **Total =** **$500.00**

Deficiency: No GFCI receptacle is installed in the lunch room area.

Recommendation: Install GFCI where needed.

Materials: $100.00 **Labor:** $300.00 **Quantity:** **Total =** **$400.00**

Deficiency: Employee rest room, map closet, and storage room lighting levels are not adequate. No outlets are installed in these rooms.

Recommendation: Install light fixtures and receptacles in these areas.

Materials: $100.00 **Labor:** $400.00 **Quantity:** **Total =** **$500.00**

ELECTRICAL 5420 Electrical Distribution System - Museum Area

All Estimable Items

Materials: $2,407.00 **Labor:** $7,100.00 **Total =** **$9,507.00**

Feature Description:

Feature Notes:

Feature Condition: Fair **Total Inventory:**

Historic Rating: N **Priority:** High

Deficiency: There is only one electrical outlet installed in this area.

Recommendation: Install additional outlets

Materials: $1,100.00 **Labor:** $7,000.00 **Quantity:** **Total =** **$8,100.00**

Deficiency: There are no exit signs installed to direct people to the exits in the event of losing power.

Recommendation: Install exit signs

Materials: $60.00 **Labor:** $100.00 **Quantity:** **Total =** **$160.00**

ELECTRICAL 5420 Electrical Distribution System - Lobby Area

All Estimable Items

Materials: $125.00 **Labor:** $555.00 **Total =** **$680.00**

Feature Description:

Feature Notes:

Feature Condition: Fair **Total Inventory:**

Historic Rating: N **Priority:** High

Deficiency: Additional receptacles are needed

Recommendation: Install additional receptacles

Materials: $100.00 **Labor:** $500.00 **Quantity:** **Total =** **$600.00**

Deficiency: The water fountain needs a GFCI receptacle

Recommendation: Install GFCI receptacle

Materials: $25.00 **Labor:** $55.00 **Quantity:** **Total =** **$80.00**

ELECTRICAL 5420 Electrical Distribution System - Assembly Room

All Estimable Items

Materials:	$560.00	Labor:	$2,100.00	Total =	$2,660.00

Feature Description:

Feature Notes:

Feature Condition: Fair **Total Inventory:**

Historic Rating: N **Priority:** High

Deficiency: There are only four (4) outlets installed in the 4 center columns.

Recommendation: Install additional receptacles

Materials:	$500.00	Labor:	$2,000.00	Quantity:	Total =	$2,500.00

Deficiency: There are no emergency lights installed.

Recommendation: Install emergency light packs

Materials:	$60.00	Labor:	$100.00	Quantity:	Total =	$160.00

ELECTRICAL 5420 Electrical Distribution System - Exterior Lighting

All Estimable Items

Materials:	$0.00	Labor:	$2,500.00	Total =	$2,500.00

Feature Description:

Feature Notes:

Feature Condition: Fair **Total Inventory:**

Historic Rating: N **Priority:** High

Deficiency: Exterior lighting fixtures are rusted

Recommendation: Replace exterior lighting fixtures to match original

*Materials are included in architectural comments on lighting.

Materials:	$0.00	Labor:	$2,500.00	Quantity:	Total =	$2,500.00

BUILDING/GROUNDS UTILITIES

BLDG/GRDS UTII 5810 Plumbing System

All Estimable Items

Materials:	$684.00	Labor:	$1,070.00	Total =	$1,754.00

BLDG/GRDS UTII 5813 Plumbing Fixture - Lavatories in Men's Public Toile

Feature Description: Wall hung lavatory, 20"x18" with integral backsplash, vitreous china, 4-inch center set faucet with metal lever handles (non-handicapped type), grid drain, angle stop valves, 1 1/4" tail piece and P-trap

Feature Notes:

Feature Condition: Good **Total Inventory:** 3

Historic Rating: H **Priority:** High

Deficiency: Lavatories do not have handicapped accessible faucet or mounting height. P-trap and HW not insulated.

Recommendation: Provide one (1) lavatory mounted at handicapped accessible height - 29 inches from floor to bottom of rim. Provide a single lever handle faucet on this lavatory. Provide offset P-trap and insulate all HW and drain lines.

Materials:	$0.00	Labor:	$104.00	Quantity:	1	Total =	$104.00

BLDG/GRDS UTII 5813 Plumbing Fixture - Lavatories in Women's Public Toile

Feature Description: Wall hung lavatory, 20"x18" with integral backsplash, vitreous china, 4-inch center set faucet with metal lever handles (non-handicapped type), grid drain, angle stop valves, 1 1/4" tail piece and P-trap

Feature Notes:

Feature Condition: Good **Total Inventory:** 3

Historic Rating: H **Priority:** High

Deficiency: Lavatories do not have handicapped accessible faucet or mounting height. P-trap and HW not insulated.

Recommendation: Provide one (1) lavatory mounted at handicapped accessible height - 29 inches from floor to bottom of rim. Provide a single lever handle faucet on this lavatory. Provide offset P-trap and insulate all HW and drain lines.

Materials:	$0.00	Labor:	$104.00	Quantity:	1	Total =	$104.00

BLDG/GRDS UTIl 5813 Plumbing Fixture - Lavatories in Employees' Toile

Feature Description: Wall hung lavatory, 20"x18" with integral backsplash, vitreous china, 4-inch center set faueet with metal lever handles (non-handicapped type), grid drain, 1 1/4" tail piece and P-trap. White.

Feature Notes:

Feature Condition: Good **Total Inventory:** 1

Historic Rating: H **Priority:** Low

Deficiency: Not handicapped accessible

Recommendation: None

Materials: $0.00 **Labor:** $0.00 **Quantity:** 0 **Total =** **$0.00**

BLDG/GRDS UTIl 5813 Plumbing Fixture - Water Closets in Men's Public Toile

Feature Description: Wall hung, vitreous china, elongated water closet with concealed flush valve back spud. Elongated seat with open front. White

Feature Notes: One water closet is designated as handieapped accessible.

Feature Condition: Good **Total Inventory:** 3

Historic Rating: H **Priority:** High

Deficiency: Water closet designated for handicapped is not mounted at proper height for handicapped accessibility.

Recommendation: Mount water eloset at handicapped accessible height - 17" to 19" from floor to rim. If rough-in piping cannot be reworked, provide 3" seat for elongated bowl.

Materials: $0.00 **Labor:** $104.00 **Quantity:** 1 **Total =** **$104.00**

BLDG/GRDS UTIL **5813** **Plumbing Fixture - Urinals in Men's Public Toile**

Feature Description: Wall hung, vitreous china, blow out, flush action type urinals, with 1 1/4" inlet spud, 2" outlet White

Feature Notes:

Feature Condition: Poor **Total Inventory:** 3

Historic Rating: H **Priority:** High

Deficiency: Flush valve leaks. Urinals are not handicapped accessible.

Recommendation: Replace 3 flush valves. Mount one urinal at handicapped accessible height - 17" from floor to rim.

Materials: $289.00 **Labor:** $195.00 **Quantity:** 3 **Total =** $484.00

BLDG/GRDS UTIL **5813** **Plumbing Fixture - Water Closets in Women's Public Toile**

Feature Description: Wall hung, vitreous china, elongated water closet with concealed flush valve back spud. Elongated seat with open front. White

Feature Notes: One water closet is designated as handicapped accessible.

Feature Condition: Good **Total Inventory:** 5

Historic Rating: H **Priority:** High

Deficiency: Water closet designated for handicapped is not mounted at proper height for handicapped accessibility.

Recommendation: Mount water closet at handicapped accessible height - 17" to 19" from floor to rim. If rough-in piping cannot be reworked, provide 3" seat for elongated bowl.

Materials: $0.00 **Labor:** $104.00 **Quantity:** 1 **Total =** $104.00

BLDG/GRDS UTIL 5813 Plumbing Fixture - Water Closets in Employees' Toile

Feature Description: Floor mounted, flush valve type, top spud, vitreous china, elongated water closet, with white elongated less cover/open front seat. White.

Feature Notes: Not handicapped accessible.

Feature Condition: Good **Total Inventory:** 1

Historic Rating: II **Priority:** Low

Deficiency: Not handicapped accessible
proper height for handicapped accessibility.

Recommendation: None

Materials: **Labor:** **Quantity:** **Total =** $0.00

BLDG/GRDS UTIL 5813 Plumbing Fixture - Service Sink in Janitor's Close

Feature Description: Enameled cast iron, wall hung, 24"x20" service sink, with stainless rim guard. 3" cast iron P-trap.
Back mounted sink faucet with 8" centers, lever handles, threaded end hose spout, 1/2" supply, rough chrome finish.
Vacuum breaker mounted on hose end

Feature Notes:

Feature Condition: Good **Total Inventory:** 1

Historic Rating: H **Priority:** N/A

Deficiency: None

Recommendation: None

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** $0.00

BLDG/GRDS UTII 5827 Exterior Drinking Fountain

Feature Description: Poured in place concrete, 2 bowl concave square basins, piping cast inside, round concrete pad insert into walk at lower level. Stainless steel drain grid, with exposed P-traps

Feature Notes: This was a deliberate design feature on the site. Drinking fountain fixtures have been removed. All that remains are the concrete pedestal and basins.

Feature Condition: Non-functioning **Total Inventory:** 1 EA

Historic Rating: H **Priority:** H

Deficiency: Working parts are missing, concrete parts are cracked and broken out.

Recommendation: Demolish and replace drinking fountain with new, pedestal mounted, dual height, ADA accessible, freeze resistant drinking water fountain to match original design.

Materials: $395.00 **Labor:** $355.00 **Quantity:** 1 **Total =** **$750.00**

BLDG/GRDS UTII 5827 Interior Drinking Fountain

Feature Description: Wall hung, electric water cooler. Handicapped accessible, touch pad in front

Feature Notes: Not original to the building, but in original location.

Feature Condition: Good **Total Inventory:** 1 EA

Historic Rating: H **Priority:** H

Deficiency: Too close to wall for handicapped access out,

Recommendation: Minimum clear floor area should be a space of 30"x40"

Materials: $0.00 **Labor:** $104.00 **Quantity:** 1 **Total =** **$104.00**

BLDG/GRDS UTIL 5828 Water Heater

Feature Description: 40 gallon, 4.5 kw electric water heater, upright model

Feature Notes: Bradford-White 2000 year model M-I-40S6DS, 20 GPH recovery, 90 deg. F rise

Feature Condition: Excellent **Total Inventory:** 1 EA

Historic Rating: N **Priority:** N/A

Deficiency: None

Recommendation: None

Materials: $0.00 **Labor:** $0.00 **Quantity:** 1 **Total =** **$0.00**

BLDG/GRDS UTIL 5830 Electrical System

All Estimable Items

Materials: $23,400.00 **Labor:** $3,250.00 **Total =** **$26,650.00**

BLDG/GRDS UTIL 5833 Outside Lighting Fixture/Upper Roof Lighting

Feature Description: Rooftop Flood Lights - Two Stonco Flood Lights at each corner of the dome mounted on the low roof

Feature Notes: These fixtures are noted because of their significance. They do not exist at this time. They were probably removed when the elastomeric roof was installed in the early 80s.

Feature Condition: Missing **Total Inventory:** 8 EA

Historic Rating: H **Priority:** Critical

Deficiency: Missing

Recommendation: Reinstall

*Labor costs are included with Electrical costs.

Materials: $1,000.00 **Labor:** $0.00 **Quantity:** **Total =** **$1,000.00**

BLDG/GRDS UTII 5833 Outside Lighting Fixture/Exterior Soffit Lighting

Feature Description: Recessed Can Lights in Building Soffit - A series of exterior recessed can lights were installed in the soffits of the west and south elevations of the Assembly Room.

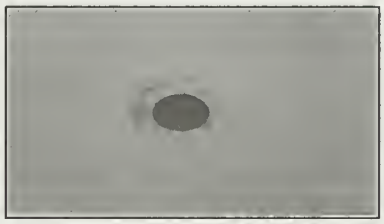
Feature Notes: These fixtures remain intact. The fixtures appear to be in some state of deterioration from exposure to the salt air over time.

Feature Condition: Poor **Total Inventory:** 16 EA

Historic Rating: H **Priority:** Critical

Deficiency: Deteriorated

Recommendation: Restore or replace to match existing



*Labor costs are included with Electrical costs.

Materials: $2,000.00 **Labor:** $0.00 **Quantity:** **Total =** **$2,000.00**

BLDG/GRDS UTII 5833 Outside Lighting Fixtures/Wall Sconces

Feature Description: Wall Sconces at East Columns at Restrooms - Exterior Wall Sconces at Public Restrooms and Staff Entry to Office

Feature Notes: McPhilben 4-70 Wall Sconces with 2, 50 bulbs each

Feature Condition: Good **Total Inventory:** 3 EA

Historic Rating: **Priority:** Critical

Deficiency: None identified

Recommendation: Restore or replace to match existing

*Labor costs are included with electrical costs.

Materials: $900.00 **Labor:** $0.00 **Quantity:** **Total =** **$900.00**

BLDG/GRDS UTII 5834 Interior Light Fixtures/Flight Room

Feature Description: Custom Made Fixture/Recessed Can Lights - The Assembly room contains 12 custom designed fixtures fabricated from steel angles and sheet metal and integrated into the exposed HVAC duct detail in the ribbed ceiling. The balance of the light fixtures in the room are recessed can lights around the perimeter of the room. On the two walls on which portrait are displayed, the can lights are not directional suggesting that the portrait display was not a part of the original exhibit scheme. There is one spot on the east wall, inserted into the cypress paneling, and a pair of lights on the east wall which appear to have been installed to accent the Flight Room exhibits.

Feature Notes: The custom fixtures at the ribbed ceiling are intact and all exist as are the can lights. The exhibit spot appears to not be operable at the time of the site visit.

Feature Condition: Custom-Good/Excellent
Recessed-Good **Total Inventory:** 12 Custom Fixtures
12 Recessed can lights

Historic Rating: **Priority:**

Deficiency: None

Recommendation:

Materials: $3,600.00 **Labor:** $3,000.00 **Quantity:** **Total =** **$6,600.00**

BLDG/GRDS UTIL 5834 Interior Light Fixture/Museum/Lobby Fixtures

Feature Description: Surface Mounted Can Lights and Adjustable Exhibit Spots - The original lighting scheme in these two spaces consisted of surface mounted can lights above the honeycombed suspended ceiling and directional spot lights mounted to the suspended ceiling. Additionally, a portal light was inserted into the north wall panelling. There have been substantial changes in number and locations of spotlights. Due to the installation of a non-contributing suspended ceiling in the Lobby, the light configuration in that area has changed to a lay-in system. There were no floodlights indicated on the original plan in the Lobby. However, there were spotlights in the northeast corner of the area.

Feature Notes: Some of the surface mounted can fixtures exist in both the museum and the lobby but are not currently used. Their use is likely discouraged by the difficulty to access for rebulbing, a consideration for the restoration and continued use of the building.

Feature Condition: Good to Missing

Total Inventory: 16 Surface in Lobby
6 Surface in Museum
16 Directional in Museum

Historic Rating: Lay-in: N
Floods: H
Surface: H

Priority: Critical

Deficiency: Non-contributing lay-in fixtures, missing flood lights and surface-mounted can lights.

Recommendation: Remove lay-in gird and fluorescent fixtures. Restore or replace to match original floods and surface-mounted cans.

*Labor costs are included with Electrical costs.

Materials: $15,000.00 **Labor:** $0.00 **Quantity:** **Total =** **$15,000.00**

BLDG/GRDS UTIL 5834 Interior Light Fixture/Hexcel Honeylite Grid

Feature Description: Suspended Grid/Diffuser - This material appears as a black suspended grid. The panel has a honeycomb pattern and the assembly is designed for light diffusing.

Feature Notes: This material, while serving as a ceiling finish, is actually an integral part of the original lighting scheme for the building.

Feature Condition: Good in Museum
Missing in Lobby

Total Inventory: 1,60 SF

Historic Rating: H

Priority: Critical

Deficiency: Lobby sections missing

Recommendation: Replace missing grid in Lobby, restore existing grid in Museum

*Materials and Labor included in Grid Restoration

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

BLDG/GRDS UTII 5834 Interior Light Fixture/Office Fluorescent Fixtures

Feature Description: 4'x4' Surface mounted fluorescent fixtures, box frame fixture located in office area

Feature Notes: All of these fixtures exist and appear to be in working order.

Feature Condition: Good **Total Inventory:** 6 EA

Historic Rating: H **Priority:** Critical

Deficiency:

Recommendation: Restore to level consistant with the balance of the building.

*Materials and Labor costs included with Electrical costs.

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

BLDG/GRDS UTII 5834 Interior Light Fixture/Restroom Fixtures

Feature Description: Surface mounted fluorescent fixtures

Feature Notes: With the replacement of the original suspended ceiling in the restrooms, the ceiling lights appear to have been replaced. The wall mounted fixtures over the sinks appear to be original.

Feature Condition: Fair **Total Inventory:**

Historic Rating: N **Priority:** Historical

Deficiency: Non-contributing

Recommendation: Remove and replace with fixture to match original if space is restored for restrooms.

Materials: $900.00 **Labor:** $250.00 **Quantity:** **Total =** **$1,150.00**

BLDG/GRDS UTII 5840 HVAC System - Architectural Observation

All Estimable Items

Materials: $92,739.00 **Labor:** $29,532.00 **Total =** **$122,271.00**

Feature Description: All currently operating air conditioning systems are not original to the building and are not replacements-in-kind of the original system.

Feature Notes: The original design of the air conditioning system was integral to the building design. However, it was found to have design flaws early in the life of the building and was modified and finally replaced.

Feature Condition: **Total Inventory:**

Historic Rating: **Priority:**

Deficiency:

Recommendation: If possible, reconfigure air conditioning system in the Assembly room such that it does not intrude into the character of the space and uses the integral ductwork in the ribbed ceiling.

Materials: **Labor:** **Quantity:** **Total =** **$0.00**

BLDG/GRDS UTIL 5840 HVAC System - Water Chiller

Feature Description: The water chiller is an electrically controlled, reciprocating type liquid chiller utilizing two semi-hermetic type compressors with a capacity of 50 tons. This unit was installed in 1968 and manufactured by Carrier.

Feature Notes: The unit is located in the mechanical room. Nameplate data: Carrier model No. 30HS050-A150, Serial No. 7477370. One compressor was replaced in 1989.

Feature Condition: Fair **Total Inventory:** 1

Historic Rating: N **Priority:** Low

Deficiency: Evaporator coil pull clearances appear to be inadequate. Showing signs of leaking oil. Unit is operating past its expected life cycle of 20 years.

Recommendation: Replace unit.

Materials: $30,500.00 **Labor:** $12,500.00 **Quantity:** 1 **Total =** **$43,000.00**

BLDG/GRDS UTIL 5840 HVAC System - Condensing Unit

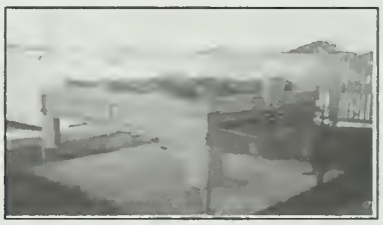
Feature Description: Outdoor-mounted, air-cooled coil, propeller-type condenser fans. Refrigeration circuits include hot gas and liquid lines. The unit installed in 1968 was replaced in 1989.

Feature Notes:

Feature Condition: Fair **Total Inventory:** 1

Historic Rating: N **Priority:** Low

Deficiency: The unit casing shows signs of rust and corrosion, especially on the top and underside of the unit. The condenser coil appears to be aluminum fins with some build-up and corrosion. All exposed refrigerant lines are not insulated.



Recommendation: Repaint and resurface the unit casing with a resistant coating due to the corrosive atmosphere in the area. Clean the condenser coil on the underside of the unit. Insulate all the exposed refrigerant lines. If the unit is to be replaced in the near future, a unit coated with a prepainted, baked enamel finish on casing and seamless copper tubes with copper fins/factory phenolic-hiresite coating should be specified.

Materials: $11,390.00 **Labor:** $2,010.00 **Quantity:** 1 **Total =** **$13,400.00**

BLDG/GRDS UTII 5840 HVAC System - Boiler

Feature Description: The boiler is a packaged vertical firetube water boiler, fired with #2 fuel oil. This boiler has been in operation since 1968. The capacity of the boiler is 728,000 BTU/hr. It is manufactured by Weil Mclain Company.

Feature Notes: The boiler is located in the mechanical room. Nameplate data; Weil-Mclain Co., Size BL-584SF, Oil 6.50 gph, Max. working pressure water 30 psi, Min. water 728,000 BTU/hr.

Feature Condition: Fair **Total Inventory:** 1

Historic Rating: N **Priority:** High

Deficiency: The boiler has been in operation for 32 years. Although the unit appears to be of sturdy construction, major replacement parts may not be available from the manufacturer. The expected service life of this type of boiler is approximately 35 years, based on conversations with the manufacturer's representative. It has reached the end of its serviceable life. Also, the boiler was installed less than 3 feet from the electrical panels, which does not meet code requirements for servicing.

Recommendation: Replace the boiler with a higher efficiency boiler large enough to satisfy the heating requirements of the building. Determine a new location for the boiler which would meet code servicing requirements or relocate the electrical panels.

Materials: $11,415.00 **Labor:** $1,585.00 **Quantity:** 1 **Total =** **$13,000.00**

BLDG/GRDS UTII 5840 HVAC System - Main Circulating Pump (P-1)

Feature Description: The pump is a close-coupled, centrifugal pump, floor-mounted type, supplying either chilled water or hot water to fan coil units serving lobby area and offices. This pump was replaced in 1968 and again in 1989 with the same sized pump that was installed originally in 1958.

Feature Notes: Located in the mechanical room. No access available to get nameplate data due to congested piping above. The contract drawings from 1968 and 1989 indicate a capacity of 95 GPM, 40 feet head, 2 HP, manufactured by bell & Gossett (B&G), model 1531-2AB. However, a letter of transmittal was found submitted by a contractor in 1997 which indicates a 3HP, B&G model 1531-2.5AB, 1750 rpm.

Feature Condition: Fair **Total Inventory:** 1

Historic Rating: N **Priority:** Low

Deficiency: The pump is supported insecurely, resting on a piece of wood block. Bolts and nuts at flanged connections show signs of rust. Flexible pipe connectors are not installed on suction and discharge lines at pump.

Recommendation: Support and anchor the pump to a concrete housekeeping pad approximately 4 inches high. Provide flexible pipe connectors and flanges with bolts and nuts at pump connections.

Materials: $350.00 **Labor:** $450.00 **Quantity:** **Total =** **$800.00**

BLDG/GRDS UTIL 5840 HVAC System - Zone Circulating Pump (P-2)

Feature Description: In-line centrifugal pump, supplying only hot water to wall-mounted radiation heaters in toilets and office lobby. This pump was replaced in 1968 with the same sized pump as the original construction in 1958.

Feature Notes: Suspended from ceiling with a clevis hanger in the mechanical room. No nameplate data. The 1968 contract drawing indicates a capacity of 20 GPM, 10 feet head, 1/6 HP, manufactured by Bell & Gosset (B&G), model 1-1/2 HV.

Feature Condition: Fair **Total Inventory:** 1

Historic Rating: N **Priority:** High

Deficiency: The pump has been in operation for 32 years and has reached the end of serviceable life. Flexible pipe connectors are not installed on the suction and discharge lines at the pump.

Recommendation: Replace with a new pump, including flexible pipe connectors and hanger rod at pump connections.

Materials: $900.00 **Labor:** $160.00 **Quantity:** **Total =** **$1,060.00**

BLDG/GRDS UTIL 5840 HVAC System - Zone Circulating Pump (P-3)

Feature Description: In-line centrifugal pump, supplying either chilled water or hot water (but not both simultaneously) to fan coil units serving Assembly Area and Museum Area. This pump was added to the system in 1968 and was replaced in 1989.

Feature Notes: Suspended from ceiling in the mechanical room. Both 1968 and 1989 contract drawings indicate a capacity of 70 GPM, 44 feet head, and 1 1/2 HP

Feature Condition: Fair **Total Inventory:** 1

Historic Rating: N **Priority:** High

Deficiency: Flexible pipe connectors are not installed on the suction and discharge lines at pump connections. A galvanized drain pan with plastic drain hose to floor drain appears to have been installed in-house due to leaking at pump connection caused by wearing out of the mechanical seal.

Recommendation: Replace with a new pump, including flexible pipe connectors and hanger rod at pump connections.

Materials: $1,200.00 **Labor:** $200.00 **Quantity:** **Total =** **$1,400.00**

BLDG/GRDS UTIL 5840 HVAC System - Ceiling-mounted Fan Coil Units

Feature Description: 11 of 15 units are original equipment with modifications incorporated to act as fan coil units. 4 units in assembly area were replaced in 1989.

Feature Notes: All units are 2-pipe one-coil units operating simultaneously in either heating or cooling mode.

Feature Condition: Fair **Total Inventory:** 15

Historic Rating: N **Priority:** High

Deficiency: The majority of these units have been in operation for more than 40 years and have reached the end of their service life.

Recommendation: Replace all units with 4-pipe fan coil units.

Materials: $23,100.00 **Labor** $1,395.00 **Quantity:** 3 **Total =** **$24,495.00**

BLDG/GRDS UTII **5840** **HVAC System - Floor-mounted Fan Coil Units**

Feature Description: 3 units were replaced in 1989

Feature Notes: All units are 2-pipe one-coil units operating simultaneously in either heating or cooling mode.

Feature Condition: Fair **Total Inventory:** 3

Historic Rating: N **Priority:** Med.

Deficiency: Units cannot operate in heating or cooling mode independently of the rest of the building system.

Recommendation: Replace 2-pipe units with 4-pipe units

Materials: $4,620.00 **Labor** $279.00 **Quantity:** 3 **Total =** **$4,899.00**

BLDG/GRDS UTII **5840** **HVAC System - Wall-mounted Radiation Heaters**

Feature Description: 1 unit in each restroom and 1 unit in office corridor.

Feature Notes: Units operate only when entire building is in heating mode.

Feature Condition: Fair **Total Inventory:** 3

Historic Rating: N **Priority:** High

Deficiency: Units cannot operate in heating or cooling independent of the rest of the building system.

Recommendation: Clean coils

Materials: $0.00 **Labor** $225.00 **Quantity:** 3 **Total =** **$225.00**

BLDG/GRDS UTII **5840** **HVAC System - Roof-mounted Exhaust Fan**

Feature Description: 1 unit serving both restrooms and the janitor's closet

Feature Notes: Unit operates when building is occupied.

Feature Condition: Fair **Total Inventory:** 1

Historic Rating: N **Priority:** High

Deficiency: Unit is unable to exhaust quantity of air needed to meet current code requirements.

Recommendation: Replace unit with direct drive exhaust fan.

Materials: $405.00 **Labor** $130.00 **Quantity:** 1 **Total =** **$535.00**

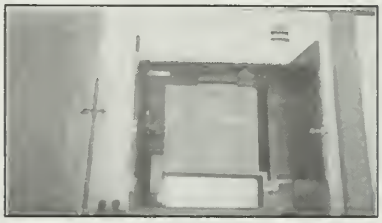
BLDG/GRDS UTIL 5840 HVAC System - Air Handling Units

Feature Description: 2 units installed in 1997 to service the assembly room.

Feature Notes: Units were added in 1997 to address HVAC capacity and indoor air quality concerns in the assembly area.

Feature Condition: Good **Total Inventory:** 2

Historic Rating: N **Priority:** Low



Deficiency: None

Recommendation: None

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

BLDG/GRDS UTIL 5840 HVAC System - Piping and Pipe Insulation

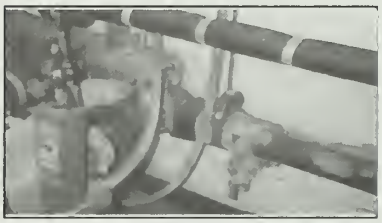
Feature Description: The majority of the piping is from the original water-to-water heating installation.

Feature Notes: The original system was to provide temepered water for the operation of heat pump units. The system was subsequently retrofitted to a two pipe system with manual changeover from ehill water (eooling) to hot water (heating) using original tempered water piping.

Feature Condition: Poor **Total Inventory:** 1200 LF

Historic Rating: H **Priority:** Med

Deficiency: Though the piping is historic, it services a feature no longer in use. It is largely not in view and so does not contribute to the public interpretation of the historic building. A lot of the insulation on the existing piping shows signs of water damage. This occurs when insulation is improperly applied, allowing condensation to buildup on the exterior surface of the pipe. Original insulation was not installed to handle the low-temperature water currently being used. Also, the system must be manually changed over from cooling mode to heating mode



Recommendation: replace damaged insualtion on existing piping. Install a separate set of hot water distribution pipes.

Materials: $9,264.00 **Labor:** $10,728.00 **Quantity:** 1200 LF **Total =** **$19,992.00**

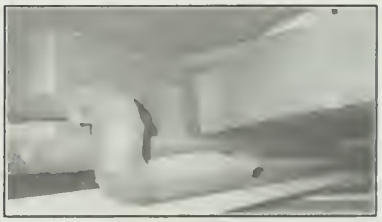
BLDG/GRDS UTIL 5840 HVAC System - Ductwork

Feature Description: Duetwork is fiberglass ductboard concealed inside soffit in assembly arca and above suspended eeilings in lobby and museum areas.

Feature Notes: Ductwork in the assembly area was installed at the same time as air handling units to inerease the quantity of air (and subsequent and latent cooling capacity) serving the assembly room)

Feature Condition: Good **Total Inventory:** U

Historic Rating: N **Priority:** L



Deficiency: Fiberglass ductboard as the potential to release fiber into the airstream, causing concerns for indoor air quality.

Recommendation: Test for indoor air quality.

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

BLDG/GRDS UTIL 5840 HVAC System - Fuel Tank-Architectural Observation

Feature Description: An above ground plastic fuel tank is located on the north side of the building adjacent to the Mechanical Room, Room No. 4. The tank is approximately 6' high, 5' wide and 10' long. This feature is screened by a non-original fence.

Feature Notes: This feature is in a reasonable location for proximity to the mechanical system it serves and to be out of primary view from the visitor. Its location is reasonable for all factors considered. However, assuming an expansion of the visitor center, this feature will likely be deemed obsolete and would be removed from the premises.

Feature Condition: See MEP evaluation **Total Inventory:** 1 EA

Historic Rating: N **Priority:** Critical

Deficiency: None identified from an architectural standpoint

Recommendation: Consider removal when system is changed out and new system installed.

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

BLDG/GRDS UTIL 5840 HVAC System/Original System-Architectural Observation

Feature Description: The original system is reported to be in working order

Feature Notes: The original units, particularly in the outside soffits on the west and south side of the building appear to have significant deterioration due to exposure to the salt laden air.

Feature Condition: Fair to Poor **Total Inventory:**

Historic Rating: U **Priority:** Critical

Deficiency: Deteriorating systems with inadequate capacity.

Recommendation: This is a critical issue due to the careful integration of the original system into the building design. Redesign of a system for this building should be accommodated in spaces that do not intrude on the character of the original spaces.

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

BLDG/GRDS UTIL	5840	HVAC System/Supplemental-Architectural Observation	

Feature Description: Supplemental HVAC System for Assembly Room - The supplemental systems were added into alcoves created by enclosing recessed windows on the north side of the building and furring down areas for ductwork on the outer perimeter of the ribbed ceiling in the Assembly Room.

Feature Notes: This addition is an intrusion on the historic character of the building. It is clearly, however, a statement on the lack of capacity of the original system to supply the heating and cooling needs of the Assembly Room

Feature Condition: Good **Total Inventory:**

Historic Rating: N **Priority:** Critical

Deficiency: Intrusion on Assembly Room

Recommendation: Remove and redesign HVAC system to respect historic spaces and satisfy building load requirements.

Materials: $0.00 **Labor:** $0.00 **Quantity:** **Total =** **$0.00**

FEATURE INVENTORY: ESTIMABLE COST TOTALS

Materials: $497,144 **Labor:** $675,946 **Total =** $1,173,090.00

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NPS D-433 January 1997

National Park Service
U.S. Department of the Interior

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